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Correspondence

October 21, 1958

Dear Dr. Aitken:

I read with interest your editorial in the October 15 issue of the JOURNAL (page 439), and concur in your opinion that an adequate reserve of anti-hog cholera serum is necessary.

I would propose that should a federally supported "stockpile" be necessary, it would be advisable to make this stockpile in the form of dried, partially purified immune porcine *gamma* globulin. Such a product would be far more stable than the standard antiserum and could be stored for much longer periods of time in the stockpile and require less costly storage facilities.

I have no definite information on the cost of preparing this *gamma* globulin but it should be cheaper than replacing outdated antiserum.

Very truly yours,
s/D. T. BERMAN
Madison, Wisconsin

● ● ●

October 23, 1958

Dear Sir:

The note on cesarotomies in the October 15 issue of the JOURNAL (page 421) is an interesting example of the art of uncritical medical historiography in that it contains not less than five errors or statements of doubtful validity. What would appear to be the facts, according to the more capable medical historians, is that Jakob Nufer, a Swiss sow gelder (not a German veterinary surgeon) operated on his wife in the year 1500 (some say "about" 1500), with both mother and baby surviving.

The designation of "cesarean" does not date to the birth of Julius Caesar (first century B.C., not "the same century"). Rather the term comes from Lex Caesare, the code of Roman law (originally Lex Regia, 7th century B.C.), which specified that the baby should be removed from any woman who died while pregnant. However, Caesar's mother survived the birth.

It is doubtful that sow gelders of 1500 A.D. practiced veterinary medicine except, perhaps, upon swine, because specialization was characteristic of the time, and the sow gelder was only one step above the common castrator. Moreover, some historians doubt that this was a true cesarean section, considering it more likely that the pregnancy was extrauterine. While this is the first case in which the names of the principals are known, there is good evidence in the *Talmud* that the ancient Jewish physicians had performed the operation successfully.

Sincerely yours,
s/J. F. SMITHCORS
E. Lansing, Mich.

[We goofed horribly, but since our *faux pas* stimulated this reply, we may benefit from it.—ED.]

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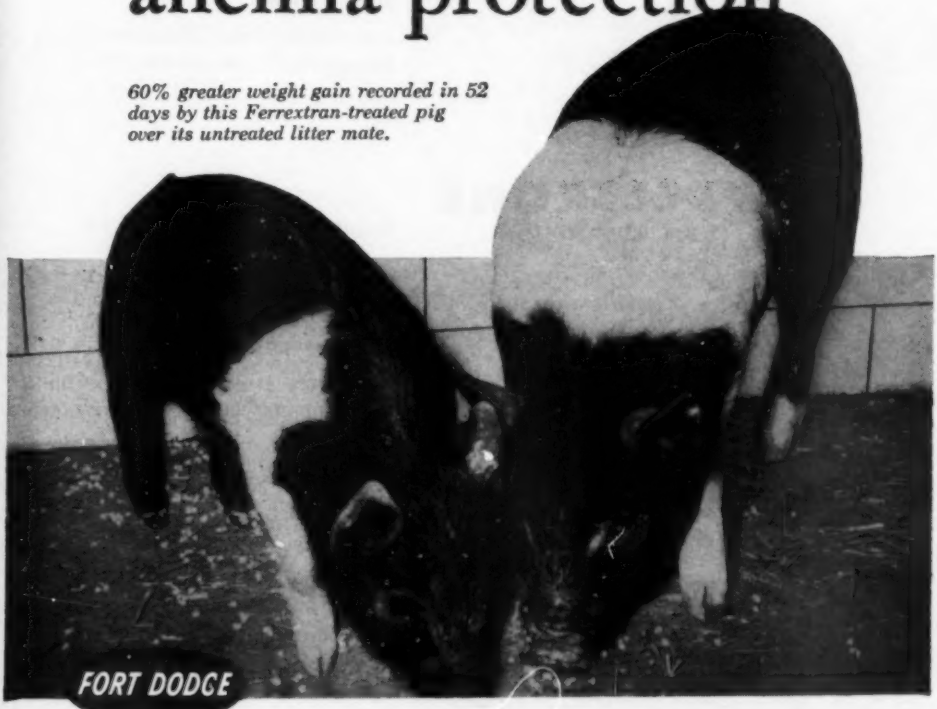

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1. Mires, M. H., and Chadwick, R. H.: Vet. News 10:3 (Jan.-Feb.) 1947. 2. Mires, M. H.: J. Am. Vet. M. Ass. 117:49 (July) 1950.

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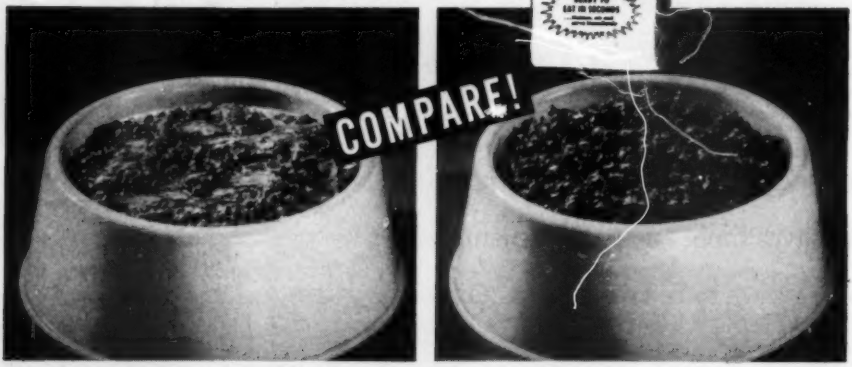

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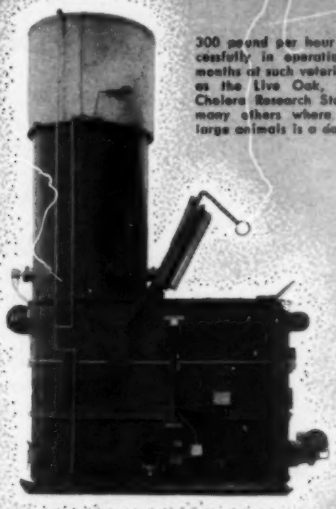

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REFERENCES: 1. Bull, W. S.: N. Amer. Vet., in press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., in press.

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*Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

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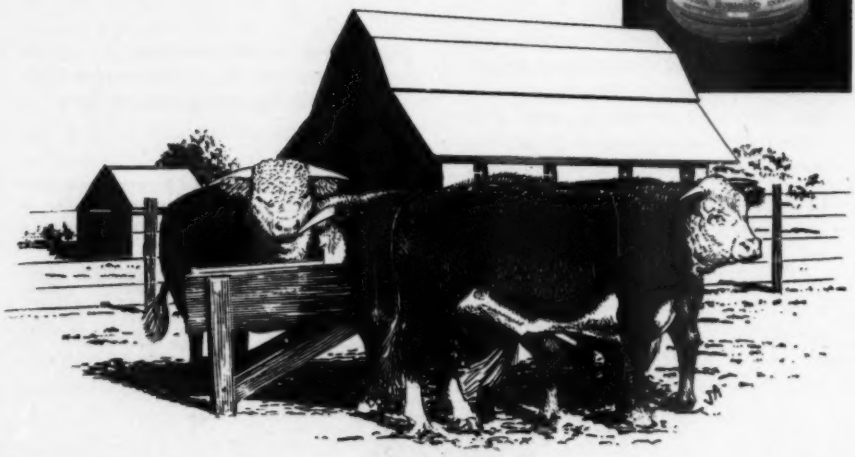

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New AVMA Executive Board Members

Election of AVMA Executive Board members from three districts was completed with the counting of ballots on Dec. 3, 1958.

The election in District II (Delaware, District of Columbia, Maryland, New Jersey, Pennsylvania, and Virginia) was held to fill a vacancy created by the resignation of Dr. S. F. Scheidy following his election as president-elect of the AVMA at Philadelphia.

In accordance with the provisions of the Constitution and Bylaws, adopted during the Philadelphia meeting, elections were held in two newly-created districts—District VII (Kansas, Missouri, and Oklahoma), and District IX (Colorado, Nebraska, New Mexico, North Dakota, South Dakota, Utah, and Wyoming).

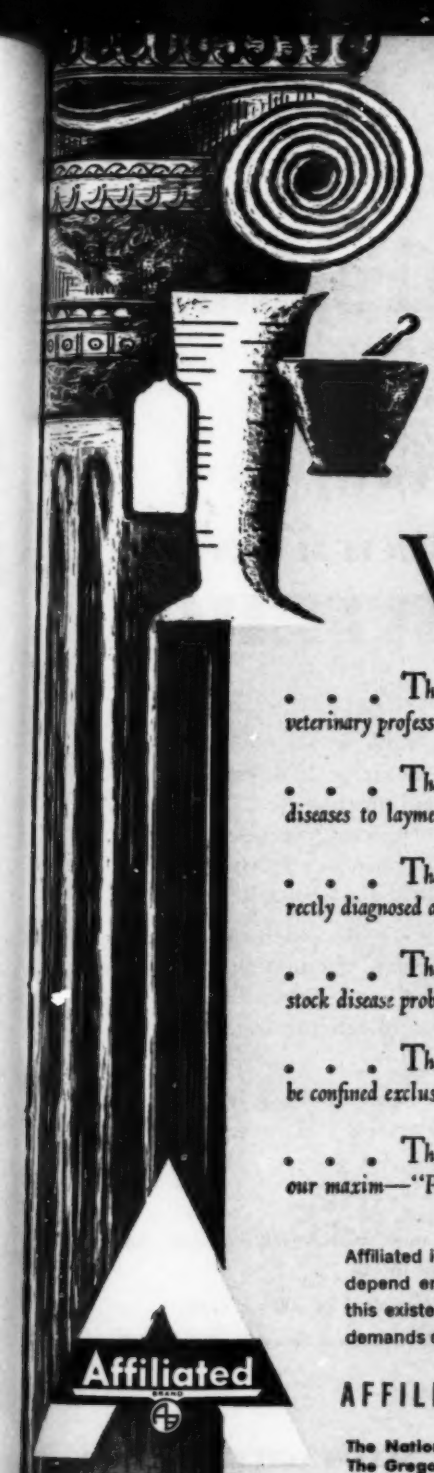
Results of the elections are as follows:

District II—Dr. Mark W. Allam, Philadelphia, Pa.

District VII—Dr. Wm. F. Irwin, Tulsa, Okla.

District IX—Dr. V. D. Stauffer, Arvada, Colo.

Drs. C. B. Hostetler, Robert C. Glover and O. W. Seher served as a Board of Tellers, and certified the election of these members to the Executive Board of the AVMA.



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1. Harris, J.R., and Clarkson, T.B., Prevention of Relapses in Milk Fever, Vet. Medicine, *12*:696 (Dec. 1955)

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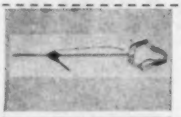

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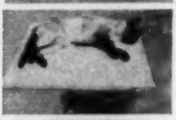

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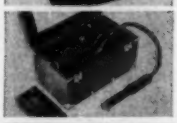

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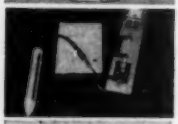

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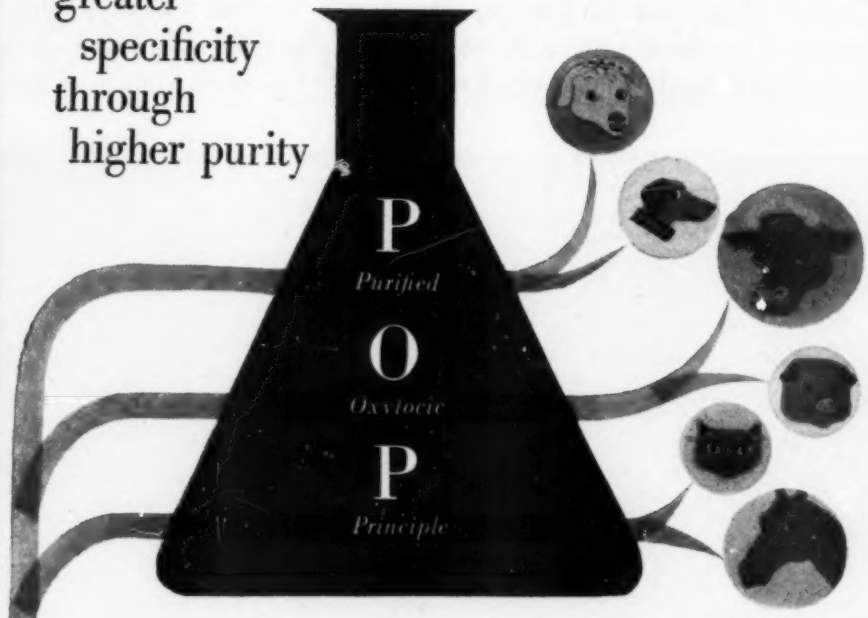

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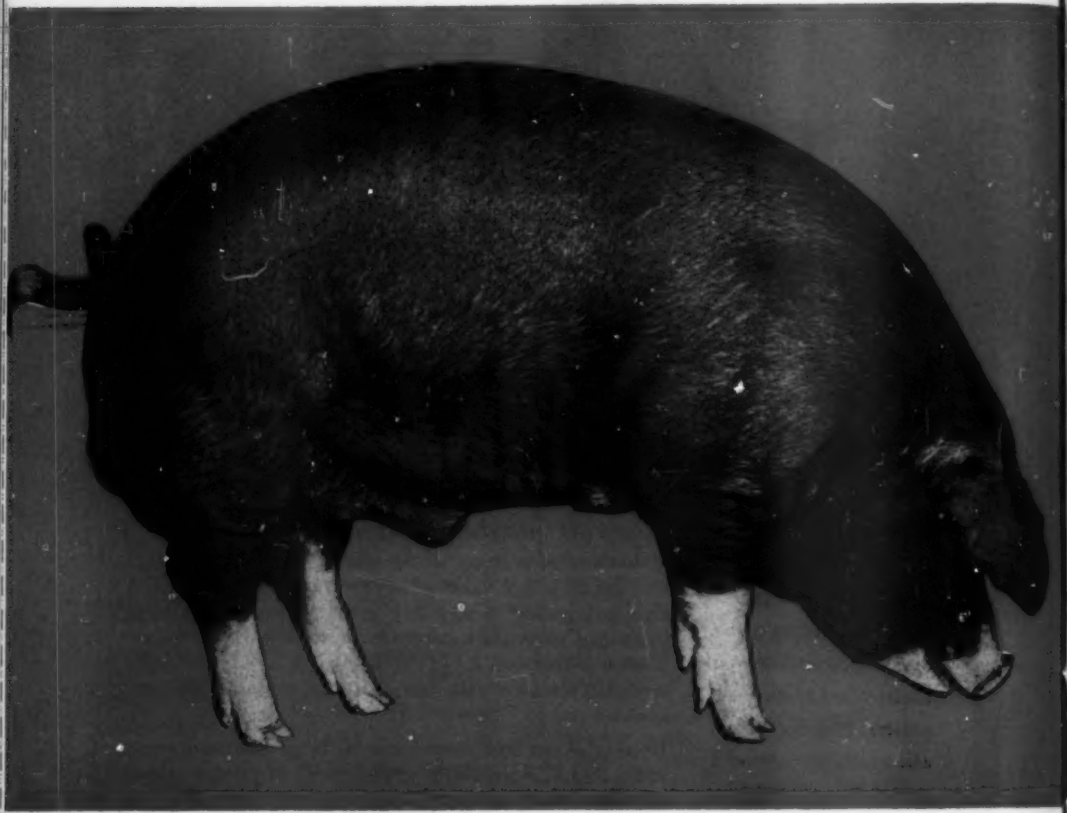

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JOURNAL
of the American Veterinary Medical Association
Established January, 1877 Chicago 5, Illinois
VOL. 134 January 1, 1959 No. 1
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A Survey of Human and Veterinary Medicine

CECIL A. KRAKOWER, M.D.

Chicago, Illinois

IN CONSIDERING the contributions of veterinary science to the welfare of man, it would not be amiss to recapitulate some of the details of its historic past. Only by such means can we gauge the magnitude and worth of its accomplishments. The development of veterinary medicine is intimately linked with that of its human counterpart, since the same biological principles determine the state of health or disease of both man and the lower animals. In fact, the history of one cannot be told without that of the other.

EARLY HISTORY OF MEDICINE

Prehistoric man was a nomad eternally in search of food. The neolithic period marked a stage when agriculture was instituted and with it the domestication of animals. Man now became a sedentary being, residing and growing his food in one spot. Population increase to some extent kept pace with the increased food supply and, from the original cradle in western Asia, man migrated in successive waves to other parts of Asia, Africa, and Europe. Wherever he settled, both he and his animals were constantly stalked by famine and disease.

Early Egyptian papyri dating from the twenty-second to the eighteenth centuries B.C. mention diseases in cattle as well as in man, and the earliest recorded attempts to control disease date from the code of Hammurabi in the nineteenth century B.C. The Mosaic laws of uncertain date established the basic principles of sanitation and dealt with means to prevent the transmission of disease from person to person and from animal to man.

However, even these simple health measures were often not adhered to, particularly as man and his animals congregated in towns and cities.

Knowledge of the nature of disease and its prevention was slow in evolving.

It is strange that in the many centuries of Egyptian civilization, when embalming of the dead was the accepted practice, that so little knowledge was acquired and transmitted regarding the structural make-up of man and lower animals and about the structural abnormalities associated with the diseases from which they suffered. The Egyptians were at liberty to dissect the human dead, whilst in other contemporary civilizations that was prohibited for the first 15 centuries of the Christian era.

The limited knowledge of the anatomy of man was, therefore, handed down from Aristotle (fourth century B.C.) and somewhat enlarged by Galen in the second century A.D., but it was based upon the dissection of animals. To this perverted knowledge of the structure of man and limited knowledge of the structure of lower animals, little was added until the fifteenth century when the genius of Leonardo Da Vinci recorded accurate anatomic drawings of dissections of man and animals, to be followed in 1543 by the "De Fabrica Humani Corporis" of Vesalius, the first modern anatomic atlas and text, and in 1598 by Carlo Ruini's first modern anatomic study of the horse.

While the study of normal gross anatomy advanced subsequently, a comparable com-

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Presented on Sept. 19, 1958, at the College of Veterinary Medicine, University of Illinois, Chicago, in observance of a decade of veterinary medical education in Illinois.

pilation and description of gross lesions had to await the eighteenth century for Giovanni Battista Morgagni's "De Sedibus et Causis Morborum per Anatomen Indagatis" (The Seat and Causes of Disease Investigated Through Anatomy), followed by Matthew Baillie's first systematic text on pathlogical anatomy.

The early studies of function, *viz.*, physiology, fared little better than those of anatomy. The experimental studies of Galen largely constituted the basic knowledge of that discipline until its firm foundations were laid by William Harvey's discovery of the circulation of the blood, published in 1628 as the result of fundamental studies made on animals.

The art and practice of medicine stem from Hippocrates who lived in the fifth century B.C. He dissociated medicine from magic and philosophy, crystallized the knowledge of the medical practice of his time into a systematic science, and gave physicians the highest moral inspiration they have. It is said that Hippocrates accomplished for internal medicine all that could be done with no other instrument of precision than an open mind and keen senses. Medicine owes to him the art of observation and clinical examination.

However, these sound principles of constant observation and study floundered for centuries amid the confused humoral and environmental concepts of disease and the varied empiric methods for treating them. It was only in the seventeenth century that Sydenham in England initiated a return to the study of the patient, followed by the bedside teaching of Boerhaave in the great school at Leyden—practices which form the bedrock of modern clinical medicine.

Veterinary medicine was apparently practiced as a specialty by the Egyptians in remote times. For a long time, it blended with human medicine and the practitioner of one served as the other; however, this was frowned upon by the Greeks. According to the teachings of Socrates and Plato, the soul was the thing that accounted for the dignity of man and aligned him with the gods. Since animals had no souls, they were not afforded the medical assistance worthy of man only.

During the Roman and Byzantine periods, veterinary medicine was again perpetuated and its practitioners, whether physicians or not, were held in high esteem. Of these, Apsyrtus in the fourth century A.D. is regarded as the father of veterinary medicine. Of the Roman compilers and translators who maintained the medical lore related to animal diseases, Vegetius in the latter half of the fifth century A.D. is best known.

When Chrisianity triumphed over the Byzantine empire, it felt the same remoteness for the animal as the disciples of Socrates and Plato, and it became a sacrilege for the physician to treat animals and for the medical schools to teach that branch of medicine. Only in areas dominated by the Arabs, and largely as a result of their attachment for horses, was veterinary medicine allowed to find its place alongside of human medicine.

Thus, throughout the Middle Ages, the Renaissance, and well into the eighteenth century, the care of animals rested largely in the hands of the farriers, the graziers, and the herdsmen. Treatment, aside from being ill-directed, was often brutal.

For many centuries, up to the eighteenth, the advance in knowledge of human and domestic animal medicine was painfully slow. There was a sound body of knowledge regarding gross anatomy and to some extent gross morbid anatomy, but the other basic preclinical sciences as we know them today were in their infancy or nonexistent. In the sphere of clinical medicine, there was a good beginning in the recognition and distinction of diseases but therapy was still primitive. Public and animal health and preventive medicine were of the most elementary type.

Life for man during these centuries was uncertain and often short. Recurrent epidemics decimated whole populations. For example, in the two years between 1348 and 1350, bubonic plague, a rat-borne disease, reduced the population of western Europe by a half and of northern Europe by a third. In addition, malnutrition, sepsis, pneumonia, and tuberculosis often cut life short.

Only the most essential operations were performed, and those by relatively unskilled barber surgeons. They were accompanied by excruciating pain relieved only by the ensuing state of shock. The wounds festered, healed slowly if the patient survived, and left unsightly scars.

In animals, the same was true. Recurrent episodes of food shortages and of epizo-

otics, such as rinderpest, wiped out large numbers of them. These terrible losses in England were ascribed[1] to "farming which, at its best, was vitiated by dirt, ignorance, and superstition while ordinary safeguards, sanitation and prophylaxis, were almost unknown. Sickness and disease due mostly to violation of natural laws were superstitiously attributed to the dreaded powers of evil spirits."

Closer to home, there has recently been vividly portrayed[7] the state of veterinary public health in colonial America. The town records of Boston include the repeated passage of legislation from 1658 onward prohibiting the "unruly and ravenous" swine from damaging life and property in their unrestricted movements throughout the town. Semiferal dogs with a high incidence of rabies roamed freely, injuring man, cattle, and sheep.

Unwholesome foods such as putrid meat and measly pork were marketed, since there was no inspection and practically no control of the sale of food. Diseases of animals were commonly transmitted to man, an excellent example being the epizootic of anthrax on St. Domingo in 1769. The dead and dying animals were salted or smoked and eaten by the inhabitants, resulting in the death of 15,000 people within the short space of six weeks.

SCHOOLS OF VETERINARY MEDICINE

About the middle of the eighteenth century, the ravages of animal plagues forced popular attention upon the veterinary arts and stimulated governments to assist in the establishment of schools of veterinary medicine. The first such school in Europe was founded at Lyons in 1761, some 700 years after the first school of medicine had been established.

Five years later, the now famous school at Alfort, near Paris, was organized. This was followed by the establishment of schools of veterinary medicine in Austria, Prussia, and in almost every other European country.

That the medical profession heartily supported the development of such schools is well illustrated by the history of the founding of the Veterinary College of London in 1792. St. Bel, who had come from France to organize the school, died in 1793. For a while there was difficulty in obtaining a successor. The celebrated John Hunter and a physician named Cline helped maintain the school until two medical men, Coleman and Moorcraft, were appointed professors. To quote from an address[3] to the students of veterinary medicine at Harvard University in 1898:

> Coleman was able by his scientific research and energetic management to raise the College to a high standard of usefulness. Owing to lack of funds, teaching was meager and had it not been for the liberality of several medical men in throwing open the doors of their lecture rooms to its pupils for instruction without pay or reward, their professional knowledge would have been sadly deficient.

Most graduates from these colleges entered the military services, replacing the farriers in the care of horses. Their establishment in civilian life was, however, a slower, more arduous process.

RECENT ADVANCES

Medicine of today is compounded in great part, therefore, of the concrete and progressive advances in the physical and biological sciences which started in the late eighteenth century and have continued unabated, and with increasing celerity, up to the present. Yet, it is a source of wonderment that the discovery of such simple devices as percussion by Auenbrugger in 1762, auscultation by René Laennec in 1819, and the sphygmomanometer to measure blood pressure by Riva Rocci in 1896 should have awaited so many centuries before being utilized in the more accurate diagnosis of diseases.

On the other hand, it required developments in the field of optics, mechanics, and chemistry before the finer structure of tissues could be determined and before microbiology could be launched as a separate science.

The simple lenses of Leeuwenhoek were totally inadequate. One can sympathize with Virchow's complaints of the chromatic aberration of light which made the observation of microscopic objects with his primitive compound microscope most difficult. And one can indeed understand why it was as recent as 1838 and 1839 that the concept was evolved by Schleiden and Schwann that plants and animals are made up of cells, and exactly 100 years since Rudolf Virchow formulated his theory of cellular pathology. This theory affirmed that all cells were derived from previously existent cells whether this occurred in or-

derly growth or in pathological states such as in tumors, and it placed emphasis on cellular changes as the basis for the manifestations of diseases.

Abbe's development of the condenser in 1872, the development of oil immersion lenses in 1876 and of apochromatic lenses in 1886 in conjunction with the development of aniline dyes and devices to fix, imbed, and section tissues made it possible for rapid progress to occur in the fields of embryology and normal and morbid histology.

The efforts of a series of brilliant investigators spearheaded by Pasteur and Koch led to the development of the sciences of microbiology, parasitology, and immunology. Here were living agents which could be clearly related to a large number of diseases in man and animals. It was not long, therefore, before means were forthcoming to protect the host against these pathogenic agents, in terms of surgical antisepsis, vaccines, antiserums, and antitoxins as well as by appropriate sanitary measures. The wide fields of public and animal health and preventive medicine were, therefore, soon established.

With the introduction of anesthetic agents by Wells, Long, Morton, and Simpson, and antisepsis by Lister, surgical operations on both man and animals could painlessly and safely be extended to a wide variety of conditions.

In conjunction with these advances were the phenomenal ones in the fields of physiology and biochemistry relating to the functions of organs in health and disease, their chemical composition, and metabolic exchanges. These led to the understanding of such diseases as diabetes, gout, hyper- or hypofunction of the endocrine glands, and to the science of nutrition.

With such armamentarium of information together with new aids, such as x rays, electrocardiographs, and a battery of laboratory tests, the diagnostic acumen of the practitioners of clinical medicine, human and animal, was immensely sharpened, and therapy became more meaningful and more clearly directed toward specific diseases, particularly with the advent of chemotherapy by Ehrlich.

By early diagnosis, specific therapy, and the prophylactic measures at hand, we have it in our power for the first time to control infectious and contagious diseases, including the devastating epidemics and epizootics of the past, and to prolong life while maintaining health and vigor.

CONTRIBUTIONS OF VETERINARY MEDICINE

In these advances, veterinary medicine can claim a distinct share and in fact many firsts, particularly in the field of infectious and contagious diseases.

The immunity of milkmaids to the ravages of smallpox led Edward Jenner in 1796 to the use of the lymph of the lesions of cowpox to establish such an immunity in the populace at large.

Zinkle, in 1804, showed that it was the sputum of rabid dogs that transmitted the contagion to man.

Kuchenmeister and Paget in the mid-nineteenth century showed that the pork tapeworm and trichinosis were transmitted to man by the ingestion of contaminated pork.

Anthrax in animals was the first disease definitely proved to be of bacterial origin. It was the first organism used by Robert Koch to establish his postulates relating the organism to the disease; *viz.*, the isolation of the organism, its propagation in culture, its transmission to an animal with the production of the disease, and finally the isolation of the organism from the organs of the diseased animal.

The first disease shown to be caused by a fungus was that of lumpy jaw in cattle by Bollinger in 1877, followed a year later by the discovery of the same organism in lesions of man by Israel.

The first disease shown to be caused by a protozoan was that of surra in horses and camels by Griffith Evans in 1880. This was followed soon after by Laveran's discovery of the plasmodium of human malaria.

The first viral disease in the animal kingdom that was recognized was foot-and-mouth disease of cattle by Loeffler and Frosch in 1897.

It was Smith and Kilbourne, in 1893, who were the first to demonstrate the transmission of a parasitic agent by an arthropod; *viz.*, the transmission of Texas cattle fever by ticks. This momentous discovery was of immense importance since it led to the further discovery that such diseases as malaria and yellow fever were transmitted to man by mosquitoes and typhus by lice, ticks, and mites.

It was in 1918 that Alice Evans, working

in the U.S. Bureau of Animal Industry, first showed the relationship between the organism causing abortion in cattle and swine and the human disease of brucellosis.

It was through the fundamental studies of influenzal diseases in animals that the viral nature of human influenza was finally established as late as 1933 by Laidlaw, Smith, and Andrewes of England. Distemper, an influenzal disease of dogs, was shown to be caused by a virus by Carré in 1905, and Shope in 1931 proved swine influenza to be of viral origin.

These important discoveries relate to the contributions that veterinary medicine have made to human medicine but they do not include the vast array of discoveries which their investigators have made within the stricter field of animal diseases.

MODERN VETERINARY SCIENCE

Modern veterinary science has contributed materially to the health, wealth, and happiness of mankind in a variety of other ways, although seriously hampered by almost insuperable economic barriers.

It has provided us in this country with an abundant supply of wholesome meat, dairy products, and eggs—foods of the highest nutritional value and of the utmost importance in contributing to the health of our people. But the production of these in terms of quantity and quality have only been achieved at the expense of constant vigilance, an enlightened agricultural program, education of the livestock owners, and a responsive people and government. The role of the veterinarian in this regard was perhaps best expressed by Simms,[6] in 1947, when he stated:

> Few people understand the far reaching contribution that we make to the wealth of our countries, we say glibly that the United States and Canada are the safest countries in the world for growing livestock. We recite the scourges, such as rinderpest, contagious pleuropneumonia, and foot and mouth disease which are not present here. But we haven't really informed the public of the economic significance of freedom of these maladies. Our agricultural program would have to be radically changed if these and other diseases which are common in other parts of the world were well established here. The free movement of sheep and cattle from range and ranch to feed lots would be an impossibility. The present system of shipping dairy cattle from breeding centers to the big city milk sheds would be fraught with constant danger. We have mentioned only a few of the severe infections which have been either stamped out in or kept out of our countries. From an economic standpoint, an even greater factor is the day by day work of our great body of veterinarians who are treating animals on farms, preventing and controlling outbreaks of infectious diseases and advising livestock producers regarding care and management of animals. Without these professional services, the production of meat, dairy products and eggs would be hazardous indeed and the farmer would turn from livestock production to the less speculative procedure of raising those crops which are used for human foods directly. Our people would then find their foods of animal origin too costly for the average income.

The veterinary medical profession is convinced that, faced with a soaring population, it can further increase the quantity and the quality of animal foods. Even today, in this country a third of the pigs die before they reach marketable age, one quarter of the adult chickens die each year, 1 cow in every 4 or 5 has chronic mastitis, greatly diminishing milk output. Problems of morbidity, such as parasitism, in farm animals drain the vitality of these animals and lessen their productive and reproductive abilities.

Furthermore, since the untold benefits of food inspection by veterinarians is currently limited to establishments under federal control, measures are needed, through an extension of veterinary inspection to all marketed animal foods, to prevent undesirable food from finding its way to the consumer in intrastate traffic. It is estimated that almost one third of our total meat supply escapes inspection.

Of equal importance to the supply of food from animal sources has been the control in the transmission of diseases from animals to man. There are some 115 such different diseases but the most common ones are tuberculosis, anthrax, brucellosis, rabies, psittacosis, equine encephalomyelitis, Salmonella infections, the leptospiroses, Q fever, and trichinosis.

The degree of control has varied in different countries as affected by public concern, private interests, and economic factors. In this country, we have obtained a measure of control of these transmissible diseases which few other countries can claim. In order to enhance their contributions to this field, veterinarians have specialized in the field of public health. But many complex problems have to be solved before more complete control can be

achieved. The emphasis must be on control even though most of the bacterial diseases and many of the parasitic ones, as opposed to the viral diseases, are amenable to therapy. A few examples will serve to illustrate the nature and magnitude of some of the problems.

The transmission of bovine tuberculosis to man has been reduced to a bare minimum in this country. This has been due to pasteurization of milk and the virtual eradication of the disease in cattle by the ruthless slaughter of animals which reacted positively to tuberculin testing. This plan was initiated by the federal government in 1917. By 1945, a total of 279,235,490 cattle had been tested and 3,891,950 reactors eliminated at a cost of approximately $250 million.

As a result, it is now rare to see children and young adults with glandular tuberculosis, the scrofula of olden times, or with bone and joint tuberculosis. However, in other countries, bovine tuberculosis is still a problem, both in terms of morbidity and mortality, among animals and in the human population. It was reported[5] in 1944 that 2,000 children die annually in Great Britain from bovine tuberculous infections alone.

Other diseases haven't lent themselves to eradication. Anthrax still occurs in cattle and isolated cases of the disease are reported in man. Widespread vaccination could virtually do away with the disease. Brucellosis is common in cattle and swine, and there is a fairly high incidence of the chronic form of the disease in man, particularly those who come in close contact with these animals. This disease too is being reduced by the testing and vaccination of livestock.

Salmonella infections of fowl, with their attendant serious morbidity and mortality, are common sources of salmonellosis in man, particularly in the form of an enteritis. The raising of Salmonella-free stock and appropriate sanitary measures in chicken, duck, and turkey farms could do away with the disease. But, as Hagan[2] indicates:

> The life span of most of our domestic animals is short in comparison with that of man. The cost of individual immunization in comparison with the value of the animal often is relatively high. This is the principal reason why many of our animals are not regularly immunized against well recognized disease dangers. Owners are always faced with the temptation to take a chance in order to avoid the immunization costs.

And again—

> These businesses (the raising of ducklings and broilers) depend upon large volume. Large numbers of young birds are kept in small batteries or other enclosures for a few weeks while they are being fed intensively to bring them to marketable size in as short a time as possible. These methods are economical of high priced labor but they are very unsanitary as a rule and very substantial disease losses are accepted as a normal part of the business. No precautions will be taken unless the owner believes that the number of birds saved by them will more than offset the increased costs of labor and other materials required to carry them out.

Again, certain diseases transmissible to man require some form of law enforcement for their control, or they are beyond the bounds of veterinary care. For example, rabies is enzootic among dogs in this country. This disease accounts for many human lives each year in addition to the many more that are saved by prompt local treatment of the wound and vaccination. The disease has been rigidly controlled in other countries by strict quarantine measures of imported dogs, effective measures in the elimination of stray dogs, and an active program of vaccination. The 1953 to 1954 outbreak of rabies in Cook County was only controlled by rigid enforcement through state and county legislation of the vaccination of dogs and the elimination of strays.

On the other hand, the control of such diseases as sylvatic plague with its reservoir amid rodents, and equine encephalomyelitis with its extensive reservoir in a large number of species of birds and other mammals, commands the efforts and vigilance not only of the veterinarian and public health officer but of wild life agencies as well.

Aside from his important contributions to the food supply and the prevention of the spread of disease from animals to man, the veterinarian has played an important role in the care of animal pets. Not only has this contributed immeasurably to the happiness of the owners by corrective and curative measures but also institutions have evolved, other than in veterinary colleges, such as the Angell Memorial Hospital in Boston, which matches the best in human clinical medicine in patient care and in the advancement of clinical science.

It goes without saying that animal ex-

perimentation has been fundamental in the development of the biological and medical sciences. Our understanding of physiological and pathological processes, the development of powerful therapeutic agents, such as insulin, the chemotherapeutic drugs and antibiotics, and the accomplishments in the field of cardiovascular surgery would have been totally impossible without animal experimentation and testing.

Probably the first veterinarian to become a member of a medical research staff was Dr. S. D. Brimhall, who joined the Mayo Clinic in 1915. Today, most research institutions include on their staff veterinarians who not only procure and care for the laboratory animals but actively participate in the research.

CONCLUSION

When we reflect that the field of the veterinary sciences is so vast, encompassing as it does so many different species of animals, and that the number of its workers is so few by comparison with human medicine, one is indeed impressed by its immense accomplishments.

The pressing problems in human medicine today lie in the areas of congenital diseases, structural and metabolic; the so-called "degenerative diseases" of which vascular disease is of chief importance; neoplasia; and, I would add, homotransplantation. In their solution, investigators have found comparative medicine to be of utmost importance. I need only point toward the brilliant discovery[4] that successful homografts could be established between dizygotic calves. This has given impetus to the whole problem of transplantation through immune tolerance.

A measure of the importance of comparative medicine can be gained by the fact that Columbia University has recently established such a division, although it is to the credit of the Harvard Medical School that it initiated a Department of Comparative Pathology at the turn of the century but unfortunately abandoned it with the passing of Tyzzer.

I would predict, however, that once the veterinary sciences have cleared up the many problems related to infectious and transmissible diseases, they will in the near future turn their full focus upon these problems which beset us in human medicine for, with the control of infectious diseases, the degenerative and neoplastic ones will become of importance in animals as well.

With the aid of the powerful tools forged by science in recent years and united in purpose toward the newer goals which lie ahead, I am sure that we will make speedy progress in the conquest of those captains of death such as coronary artery disease and cancer. I am confident that the veterinary colleges, through their already formidable research activities, will be in the vanguard of these scientific advances.

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Rabies Fatalities in Man

Human deaths due to rabies in the United States totaled nine in 1956; six in 1953; and four in 1958 (up to October 27). Over 52 per cent of the human deaths from 1944 to 1954 were in individuals under 15 years of age.

There is no question about the superiority of chicken embryo (Flury strain) rabies vaccine from the standpoint of duration of immunity.

Three months is the best age at which to vaccinate a pup with either chicken embryo or phenolized rabies vaccine but, because the duration of immunity is uncertain at this young age, vaccination should be repeated at 1 year of age.

Administration of chicken embryo rabies vaccine subcutaneously is inadvisable because the resulting protection is not as good as that obtained from intramuscular inoculation.

Rabies antibodies have been found in the blood of apparently healthy wild animals such as foxes, suggesting that naturally

acquired immunity results from sublethal exposures among sylvatic vectors in nature. —*E. S. Tierkel at 41st Ann. Conv., Southern V.M.A., Oct. 27-29, 1958.*

Elimination of Rabies Virus by Experimentally Infected Immune Dogs.— Dogs immunized against rabies by certain common procedures eliminated the virus in the saliva from the second to the seventeenth day, and in the urine up to the sixteenth day after experimental infection. The virus was identified by finding Negri bodies or by the complement-fixation test in mice injected with the saliva or urine.— *H. Bindrich and U. Schmidt in Arch. f. exptl. Vet.-Med., 12, (1958): 202.*

Fatherless Turkey

The tom turkey shown here (fig. 1) was hatched from an egg produced by a hen which had not been with a male for eight months. He was 42 weeks old Nov. 3, 1958, and weighed 19½ lb.

Fig. 1—A parthenogenetic turkey.

Studies conducted at the Agricultural Research Center, Beltsville, Md., have revealed a high incidence of naturally-occurring parthenogenesis among virgin Beltsville Small White turkey hens previously vaccinated against fowlpox. In the author's opinion, two factors are necessary before an advanced type of parthenogenesis can occur: (1) a genetically susceptible strain of birds; (2) an activating agent in the blood stream of the hen. This second condition appears to be in some way connected with vaccination for fowlpox.

In 1952, when these studies were initiated, 158 of 934 (16.9%) of eggs underwent a limited development upon being incubated. Two embryos found among the 934 eggs tested attained the size of a normal 3-day embryo. Today, six years later, the average incidence of parthenogenesis among eggs laid by Beltsville Small White females has increased to the level of approximately 40 per cent. Among the 7,269 eggs tested in 1958, 1,096 or 15 per cent were found to contain blood of embryonic origin. Embryos of various ages were encountered in 651 (8.96%) of the eggs examined. Fifteen poults were hatched during the 1958 season. These poults, all helped out of the shell, survived from several hours to several days.

Parthenogenetic birds are always male and twin embryos have been observed on several occasions.

Parthenogenesis may present peculiar problems. Since it occurs at about the same time that the ovum would normally be fertilized, infertility due to this phenomenon could become a significant problem. Geneticists, on the other hand, are interested in studying birds which have a "pure" genetic background.—*M. W. Olsen, Beltsville, Md. —presented at the AVMA Ninety-Fifth Annual Meeting, Philadelphia, Pa., 1958.*

Atrophic Rhinitis Eradicated

In the Netherlands, atrophic rhinitis of swine was eradicated by the so-called "stamping out" procedure. The legal measure consisted of compulsory notification, slaughter of all pigs on infected farms, indemnification, quarantine, and disinfection, and isolation of the farm for a month after this infection. The farmers were then assisted in rebuilding their swine herd.— *J. M. Van den Born in Tijdschr. Diergeneesk. (Oct. 1, 1958): 915.*

What Is Your Diagnosis?

Because of the interest in veterinary radiology, a case history and radiographs depicting a diagnostic problem are usually published in each issue.

Make your diagnosis from the picture below—then turn the page ▶

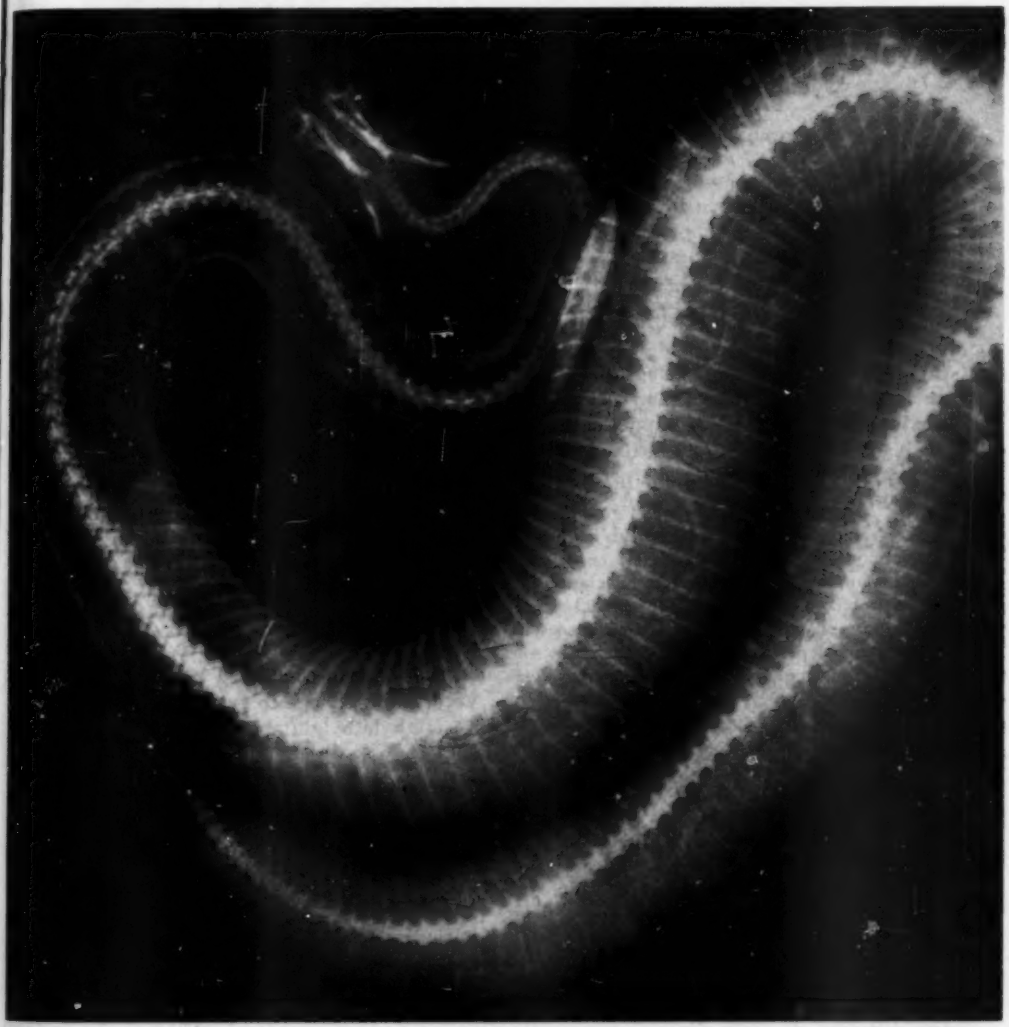

Figure 1

History.—A snake, said to be a Pacific rattler, was captured in the foothill region of Monrovia, Calif., by a herpetologist. The body was distended and a radiograph was taken to aid in determining the cause.

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Female rattlesnake with several fetuses in the uterus.

Comment.—The radiograph was taken after the snake had been confined in a refrigerator (about 45 F.) for an hour and then transported from the owner's home to the hospital in a sack containing ice cubes. The lowered temperature makes snakes sluggish and tractable; nevertheless the snake was able to coil and raise its head. Snakes of this genus are viviparous and this one gave birth to 8 living young three weeks after the picture was taken.

Radiograph submitted by Dr. Ralph C. Vierheller, Whittier, Calif.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

Staphylococcus and Hospitals

In view of the increasing problem of staphylococcic infections in hospitals, the American Hospital Association's Board of Trustees has requested wide publication of A.H.A. Bulletin No. 1. The following portions of the bulletin seem pertinent to veterinary hospitals:

It is clear that throughout the world, in spite of the enormous success of antibiotics (. . . to some extent because of this success) there remains an important problem of infections . . . of special significance for hospitals. This report is concerned with such infections, particularly those caused by the coagulase-producing strains of *Staphylococcus aureus hemolyticus*. . . .

Disease-producing staphylococci frequently implant in the nasopharynx without overt disease, thus producing carriers. Indeed, the Staphylococcus carrier-rate is a good index of the level of contamination of the environment.

There appear to be innumerable strains of Staphylococcus capable of producing infections. Many of these staphylococci are susceptible to antibiotics. . . . Hospitals are clearly the reservoir of most antibiotic-resistant strains. . . . One of the major factors in the current situation is the widespread use of antibiotics which eliminates susceptible strains of Staphylococcus and leaves uncontrolled the resistant strains.

Certain factors frequently found in hospitilization [which] appear to make the patients more likely to acquire such staphylococcic infections [include the] routine indiscriminate use of antibiotics. . . .

Certain factors in the host [which] appear to increase susceptibility to infection [include]: treatment with adrenocortical steroids; physical debility; chronic disease . . . and open wounds.

Occasionally, an entire hospital, a whole community, or a large area seems to be subject to an epidemic strain of Staphylococcus. Why this occurs is not known. Its occurrence, however, points up the need for more general recognition and study of Staphylococcus infections.

A vigorous effort to reduce the use of antibiotics and steroids to the minimum consistent with adequate patient care is recommended.

Megimide—A Barbiturate Antagonist

Tests were conducted at the Ontario Veterinary College to evaluate the effect of 3,3-methylethylglutarimide on cats and dogs.

When 6 dogs were anesthetized with a gross overdose, one-and-one-half to two times the estimated dose, 3 became cyanotic and 3 stopped breathing. When the antagonist was injected intravenously, at this critical point, the 3 which had become cyanotic returned to normal color, with an increase in shivering and pedal reflexes and recovered within six hours. Of the 3 which stopped breathing, only 1 recovered. It was believed that all 6 dogs would have died had the drug not been given.

Cats are particularly susceptible to pentobarbital sodium anesthesia and, not uncommonly, remain under its influence for as long as three days. This barbiturate

antagonist successfully roused these cats within a matter of minutes. When intravenous injection was difficult, it was found that intraperitoneal administration was just as effective, although the former is preferred.—*Canad. J. Comp. Med. & Vet. Sci. (May, 1957):165.*

Treating Rinderpest with Sulfamezathine.—During a severe epizootic of rinderpest, in 1957, 127 cattle and 29 buffaloes were given a single injection of 100 cc. of sulfamethazine sodium (33.3%) subcutaneously, and their mouths were washed with alum lotion. Of the 156 cases, 120 cattle (94%) and 20 buffaloes (69%) showed rapid improvement in two or three days and were eating in five or six days. The other 16 died.—*B. K. Salunke in Indian Vet. J. (July, 1958): 353.*

Antibiotics and Wound Strength

A controlled experiment indicated that wounds of patients given antibiotics prophylactically had a higher incidence of skin and fascial dehiscence.

In 30 rats, laparotomy wounds in 10 untreated controls proved stronger after the same interval than 10 treated prophylactically with penicillin and 10 with tetracycline. The author suggested that these antibiotics which interfere with protein synthesis in bacteria may also impair fibroplasia in the host.—*R. J. Ryan in J. Med. Soc., N. J. (July, 1958): 303.*

Veterinary Science in Russia*

Veterinary Facilities.—The U.S.S.R. has the following institutions that are committed to veterinary research: the All-Union Institute of Experimental Veterinary Medicine, the Academician Skryabin All-Union Institute of Helminthology, the All-Union Research Institute of Veterinary Hygiene and Ectoparasitology, and the State Scientific-Control Institute of Veterinary Preparations. In addition to the foregoing institutes, the system includes five republican veterinary institutes (Ukrainian, Byelorussian, Azerbaijan, Kazakh, and Usbek), four zonal research veterinary institutes (Leningrad, Kazan, Omsk, and Far-Eastern), 28 veterinary research stations in various regions of the country, and eight departments of veterinary medicine and animal husbandry in institutes dealing with these subjects.

The country has 1,280 regional and interdistrict veterinary laboratories many of which conduct research in addition to diagnostic work. There are 24 bio-factories for the research and production of inoculation preparations.

In addition to training veterinarians, the higher veterinary educational establishments (institutes, academies, and faculties) also carry out research in various branches of veterinary science. There were 33 higher veterinary schools with an enrollment of 17,570 students at the end of 1957; these schools annually graduate more than 3,000 veterinarians. Advanced training for about 1,800 veterinarians annually is provided at the Leningrad Veterinary Institute and the Moscow Veterinary Academy.

Secondary veterinary schools with three- and four-year courses of study train junior veterinary specialists.

By the end of 1957, there were in the U.S.S.R. 42,140 veterinary surgeons and 49,720 junior veterinarians with secondary education. These veterinary specialists tend the following livestock: 66.7 million head of meat cattle, including 31.4 million cows; 44.3 million swine; and 120.1 million sheep and goats. Of these numbers, the state and collective farms have 43.8 million head of meat cattle including 13.9 million cows; 34.3 million pigs; and 119.3 million sheep and goats.

• • •

Biochemistry.—Research in biochemistry is aimed at ascertaining the role of the biochemical processes of digestion in agricultural animals and of the chemical structure and biochemistry of pathogenic agents.

Acidic hydrolysis of Brucella organisms has yielded a preparation called "brucellohydrolysate" which has allergic properties suitable for allergic diagnosis of brucellosis in sheep and goats.

Electrophoresis is used to purify and concentrate the viruses of hog cholera and aftosa, making it possible to divide the virus-containing blood serum into separate protein fractions combined with virus particles. The greatest concentration of aftosa virus is found in the *beta*-globulin fraction

*These abstracts are from a paper submitted by Y. Kovalenko, All-Union Institute of Experimental Veterinary Medicine, Moscow, Kusminki, U.S.S.R.

and is associated to a lesser extent with *alpha* globulins. *Gamma* globulins and albumins contain no aftosa virus.

Hog cholera virus is associated with all three globulin fractions and is not found in the albumins. By electrophoresis, it is possible to separate aftosa and hog cholera viruses from 50 to 60 per cent of ballast proteins which contain no virus particles.

• • •

Seasonal Preference for Vaccinating Reindeer.—Studies conducted on reindeer in the tundra and the forest-tundra of the extreme North have revealed morphological and physiological changes during the different seasons of the year, according to conditions of nutrition and maintenance. The optimum physiological state of the animal occurs during the summer and autumn periods and the reverse during the winter and spring periods.

Optimal periods for vaccinating reindeer against anthrax have been chosen in accordance with these studies. Vaccination time has been changed from the spring to summer months, making it possible to eliminate completely the postvaccination complications which were common when the reindeer were vaccinated in the spring.

• • •

Artificial Insemination.—Artificial insemination of livestock is practiced through state pedigree and artificial insemination stations.

There were 400 such stations in the U.S.S.R. in 1957 and the network is expanding. At the Kiev Experimental Animal Husbandry Station, an average of 1,754 cows per bull was inseminated in 1957, the sperm of the best bull "Belyak" being used to inseminate 4,906.

In experiments with sheep, conducted at the All-Union Institute of Animal Husbandry, an average of 5,000 ewes per ram was inseminated, while 1 quality ram (live weight 134 kg., wool clip 20.7 kg.) served to inseminate 17,680 sheep with a resultant 108.5 per cent lamb crop.

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Brucellosis.—Brucellosis was first studied systematically in 1930 and, since the end of the war, considerable work has been done to reduce the number of areas affected. Between 1952 and 1956, the number of such areas decreased by 41 per cent, and in many regions the disease has been completely eradicated from both cattle and sheep.

Brucella cultures have been isolated which can not be classified with any of the three known types. Varying clinical manifestations and course of infection have been observed on the affected farms.

Brucellosis of meat cattle is widespread in many zones of the country, although it does not occur in a number of regions (Kirov, Ivanovo, Gorky, Kostroma, and other regions).

Brucellosis of sheep is widespread in areas where strakhan and fine-wool sheep are numerous. There is no brucellosis of sheep in the central, western, or northern regions; if it makes its appearance there, it is quickly eradicated.

Swine brucellosis occurs on individual farms. The cultures isolated differ sharply from those isolated in the United States; they do not form H_2S and are not highly virulent for man. It has been found that *Brucella melitensis* is transmissible to meat cattle, horses, pigs, dogs, rodents, and fowl. This fact is of serious epizootiological importance. *Brucella bovis* is transmissible to horses, dogs, fowl, and rodents, but its transmission to sheep, goats, and pigs has seldom been observed.

The agglutination reaction and the complement-fixation test are used in diagnosing brucellosis in cattle and swine. The complement-fixation and allergic tests are widely used in the diagnosis of brucellosis in sheep. Brucellysate and brucellohydrolysate are used as allergens. The best results are obtained when the allergen is administered twice, 48 hours apart.

The most widely used vaccine for cattle is prepared from dry strain 19. In the last three years, sheep and goats have also been widely vaccinated against brucellosis with a vaccine prepared from strain 19. Adult sheep and goats are vaccinated subcutaneously with one dose of 21 to 25 billion organisms. Young animals are vaccinated twice one to three months after weaning and one to two months before breeding.

After vaccination, the number of brucellar abortions sharply decreases and in many flocks is not recorded at all. The incidences of brucellosis in lambs born of vaccinated sheep is gradually decreasing. Almost 8 million sheep and goats have been vaccinated, with positive results. On affected farms, the young and adult sheep are vaccinated at least two or three years in succession.

Surgery and Obstetrics
and Problems of Breeding

Hypertrophic Osteoarthropathy in a Dog—A Clinico-Pathological Report

GEOFFREY H. LORD, D.V.M., Ph.D.

New Brunswick, New Jersey

HYPERTROPHIC OSTEOARTHROPATHY is perhaps one of the most interesting of the many diseases affecting man and animals. Although the predisposing pulmonary and cardiac anomalies have been fairly well established, there has only been one report of successful experimental production of the disease. A permanent fistula between the pulmonary artery and the left auricle was created in 4 dogs, 1 of which later developed hypertrophic osteoarthropathy.[4]

In 1889,[6] a general thickening and sclerosis of the long bones, occurring late in the course of bronchiectasis, was described. The lesion was considered secondary to a primary condition chiefly of the lungs, and the name "hypertrophic pulmonary osteoarthropathy" was suggested.

Perhaps the first reported case associated with a neoplasm of the lung in dogs was described in 1942.[5] The skeletal lesions have been described in association with a case of tuberculosis, but were considered a part of the syndrome.[3] More recent descriptions now appear in the literature.[1,2,6,8]

In medical literature, a clinical syndrome similar in all respects to the disease described in the dog has provided the same degree of interest with regard to etiology. In man, clubbing of the digits is a clinical sign.

This report serves to add to those already published on this disease.

CASE HISTORY

A healthy, 45-lb., male Springer Spaniel, 7 years old, was purchased on March 18, 1955, and was vaccinated with freeze-dried distemper vaccine.

Ten days later, a specially prepared arterial heterograft (approx. 4 cm.) was used for bridging a defect created experimentally in the abdominal aorta. The dog made a satisfactory recovery and was subsequently placed in a special colony. Graft recipients must be maintained for long periods (years) in order to evaluate the material under study.

Five months later, translumbar aortography was performed to determine the condition of the prosthesis. It was apparent that the dog was carrying numerous lead slugs, one of which was lodged in soft tissue close to the left kidney. Otherwise it was considered to be in good health.

On March 23, 1956, the general appearance seemed normal and aortography was again performed. When another aortogram was obtained (Nov. 26), a nodular swelling was noticed below the larynx. The mass measured approximately 3½ cm. at its base and extended below the skin in a conical fashion, the apex being ventral. Palpation revealed it to be somewhat adherent to the deeper structures. Thyroid adenoma was considered and the caretaker was instructed to examine the animal at frequent intervals.

On Jan. 14, 1957, the size of the mass had quadrupled and biopsy showed it to be a hemangiosarcoma.

On January 29, the tumor was resected (fig. 1) and it was found that portions of the tumor appeared to infiltrate the adjacent soft structures. The surgical wound healed without noticeable sequellae.

On April 2, the dog had purulent conjunctivitis with associated keratitis. The medial surfaces of the front paws of the dog were soiled from the ocular discharge. From this stage on, other signs rapidly developed. The dog became anorectic, showed no inclination to stand, and lost approximately 12 lb. in four weeks. The metacarpi enlarged and later became thick, indurated, clublike structures. The footpads were hyperkeratotic as a result of disuse.

Radiographs (fig. 2) revealed bilateral lesions that extended as high as the radiohumoral articulation in the forelimbs and the head of the tibia in the hindlimbs. These lesions were diagnosed as osteoarthropathy. The medial and lateral surfaces of the second and fifth metacarpal

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Fig. 1—Gross appearance of the primary tumor in a dog at the time of resection.

bones were most severely affected, followed by the carpal bones and the olecranon process.

Clinically, the entire forelimb, from the carpus to the tips of the toes, appeared to be ankylosed. The hindlimb distal to the stifle was similarly affected. Of passing interest was the presence of a shattered lead slug in the tarsal joint (fig. 3).

In view of the animal's condition, euthanasia was performed on May 3. The following data were obtained prior to euthanasia: hemoglobin—9.3 Gm. per 100 cc.; r.b.c.—5,480,000 per cubic millimeter; w.b.c.—15,050/cmm.; Lee-White coagulation—4 min. with good clot retraction; sedimentation rate—½ hour (75 mm.), 1 hour (95 mm.), 2 hours (120 mm.); differential blood count—neutrophils, 87.5%, eosinophils, 0, basophils, 0, lymphocytes, 7.5%, monocytes, 5.0%. Numerous target cells and some polychromatophilia were observed. The blood calcium was 6.0 mg./100 cc. and the blood phosphorus 7.0 mg./100 cc.

Gross Pathology.—The resected tumor weighed 270 Gm. and measured 9 by 7 by 6 cm. It was nodular in appearance. The cut surface revealed tortuous vascular channels separated by fibrous-like septae (fig. 4). The site of the primary tumor was well healed, with no evidence of regrowth.

There were extensive metastases in all lobes of the lungs, the total weight of which was 1,426 Gm. The diaphragmatic lobe of the right lung showed the most ex-

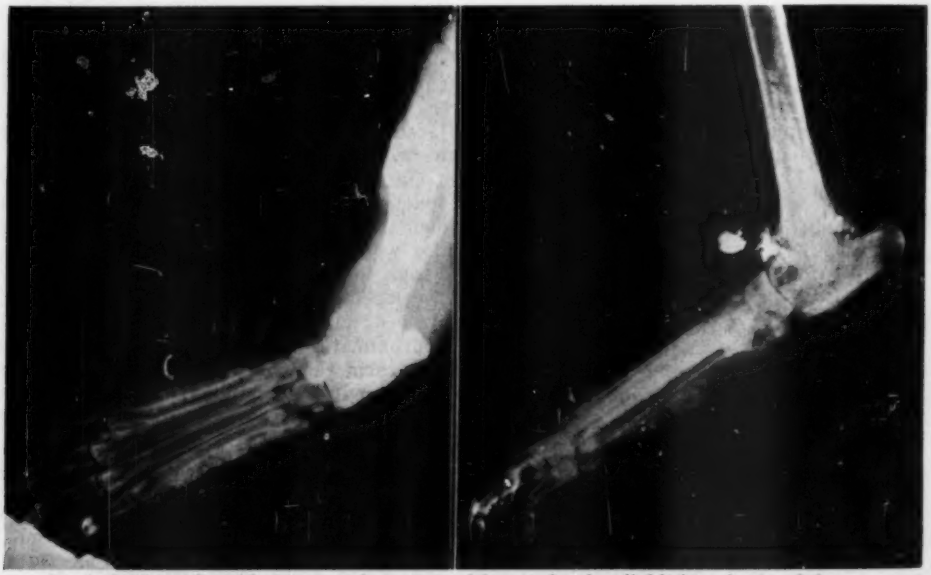

Fig. 2, 3—Osteoid proliferations on the metatarsal bones of a dog (left), lateral view of the metatarsus (right); notice lead slug in the angle of the joint and osteoid growths on the metatarsal bones.

Fig. 4—Size and general appearance of the cut surface of the hemangiosarcoma from a dog.

tensive change. It consisted of a mass of tortuous blood channels interspersed with lung parenchyma and other tissue components of the tumor. The diaphragmatic lobe of the left lung contained many tumor nodules but portions were normal.

The heart was hypertrophied and flabby and there were two grapelike metastases on the mitral valve.

The adrenal glands appeared to be hypertrophied and, on cut section, one of the lead slugs previously seen on the aortograph in the region of the kidney was found in the center of the left adrenal.

The legs from the carpi and tarsi to the tips of the extremities were thickened and indurated. This was found to be due to extensive periosteal fibrosis. The reaction was of such a nature as to prevent flexion of the joints. The affected bones were examined after removal of the soft tissue with alkali. The osteoid deposits were cauliflower-like in appearance (fig. 2). The metacarpal and metatarsal bones were most severely affected.

Histopathology.—There was extensive passive congestion in the liver. The sinusoids around the central veins were greatly distended, resulting in pressure atrophy of the hepatic cords. There was no evidence of necrosis, but there were fatty metamorphic changes in the perilobular areas. A yellowish pigment of doubtful nature was visible in most of the hepatic cells and tended to be perinuclear in distribution.

The venous channels in the kidney were markedly congested, as were the capillaries in the glomerular tufts. No degenerative changes were noticed in the tubular epithelium, but many of the cells contained large granules of greenish-yellow pigment. The pigment granules were somewhat larger than those observed in the liver. The capillaries in the medulla were congested.

Slight fatty infiltration was noticed in the zona fasiculata of the adrenals. The fat globules had coalesced to form vacuoles.

The primary tumor was composed of four types of tissue having the following characteristics: (1) large cavernous spaces lined with endothelium and filled with blood (fig. 5); (2) bands of fully differentiated loose and dense connective tissue within which pigment-laden phagocytes were scattered; (3) zones of spindle-shaped undifferentiated fibroblasts showing many features of malignancy (fig. 6); and (4) collections of tumor cells which appeared to be attempting to reproduce lymph follicles. These latter structures were scattered throughout the tissue.

Metastatic tumor masses were visible throughout the lung, with the parenchyma showing edema only. The cell type was the same as that of the primary tumor with the following exceptions: (1) There were more blood-filled cavernous spaces, and (2)

Fig. 5—Section of hemangiosarcoma from a dog, showing cavernous zone. x 75.

there was no evidence of lymph follicle formation.

DISCUSSION

Some recent theories relating to the course of the disease have been published.[1] Another writer believes that simple clubbing of the digits in man results from an increase in vascularity at the extremities due to increased arterial pressure in the areas.[3]

According to other theories,[7] hypoxemia resulting from cardiac anomalies or extensive pulmonary involvement are the most important causes of osteoarthropathy. Each of these theories seems to have more evidence against than for them. For example, in a series of over 3,000 cases of congenital heart disease (hypoxemia) only three patients with osteoarthropathy were encountered. Simple clubbing in man is frequently associated with congenital heart disease but osteoarthropathy is not.

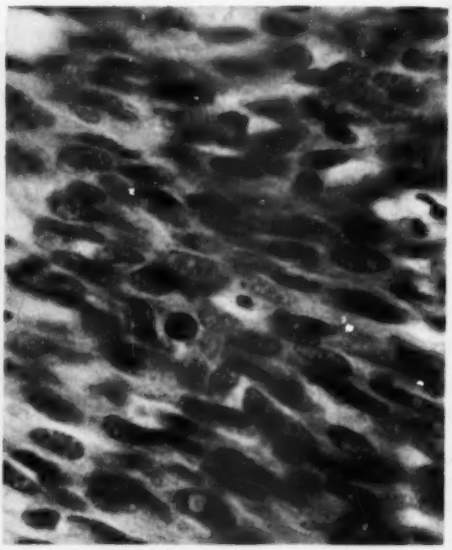

Fig. 6—Section of hemangiosarcoma; malignant zone showing pleomorphism, mitotic figures, polychromia, and general embryonic appearance of the tissue. x 650.

It is possible that the two diseases are manifestations of the same condition, the difference being mainly one of degree. The degree of hypoxemia could conceivably influence the extent to which osteoid proliferations occur and, in fact, vagotomy partly substantiates this hypothesis by virtue of providing an increased oxygen tension in cases associated with pulmonary neoplasms. Medlowitz's three experimental failures could have been due to inadequate degrees of shunting, thus providing for a tolerable degree of hypoxemia. It is apparent that more experimental work is needed in order to provide a better understanding of the etiological factors and pathogenesis of this disease.

SUMMARY

A dog in which an arterial heterograft had been used for bridging an experimentally created aortic defect developed, one year later, a hemangioma in the cervical area. By the end of the second year, lesions of hypertrophic osteoarthropathy had become recognizable and there were metastases to the lungs.

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The Formation of a Functional Osseous Callus in the Presence of Avascular Necrosis of the Femur of a Dog—A Case Report

DAVID H. BACHTEL, D.V.M., and
CHARLES R. PRESSLER, D.V.M.

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A 3-month-old male dog was presented on Dec. 10, 1957, with bilateral femoral fractures. A radiograph (fig. 1) revealed a spiral midshaft comminuted fracture of the right femur and a distal epiphyseal and transverse midshaft fracture of the left femur.

Fig. 1—Ventrodorsal radiograph of the pelvic area of a dog, showing the spiral comminuted midshaft fracture of the right femur (R), and the transverse midshaft and distal epiphyseal fracture of the left femur (L), with gross displacement of the diaphyseal fragment (No. 3).

Drs. Bachtel and Pressler are general practitioners in Canton, Ohio.

OPERATIVE PROCEDURE

The right femural fracture was reduced by open reduction with a 3/16-inch intramedullary pin following removal of the fragments.

In the left limb, the large fragment of the diaphysis (No. 3, fig. 1) was completely severed from both articular ends and from the nutrient artery, and was displaced into the subcutaneous tissue of the flank. This fragment was replaced surgically and secured to the proximal fragment (No. 2, fig. 1) with a 5/32-inch pin.

In order to avoid the necessary over-reduction of the distal fragment, a second incision was made in the dorsolateral surface of the leg over the stifle joint, the joint capsule was opened, and an additional 5/32-inch pin was introduced into the lateral condyle of the femur, passing upward into the diaphysis.

Fig. 2—Radiograph of the pelvic area of the same dog shown in figure 1, taken two months after surgery. The darkened area over the neck of the left femur and the black lines extending distally from the trochanter and from the neck are artifacts. The large fragment (No. 3) has begun to lose density as compared to figure 1. The callus extends from No. 2 to 4 where it has united with the distal epiphysis.

ward again to a point where the lower end of the pin was recessed from the articular surface of the condyle and again seated firmly.

DISCUSSION AND CONCLUSION

Our chief postoperative concern was the re-establishment of vascularity to the large diaphyseal fragment of the left femur, since it was a "free floating fragment."

A radiograph taken Feb. 9, 1958, revealed a large callus (No. 4, fig. 2) medial to the fragment (No. 3, fig. 2) and avascular necrosis of that fragment as indicated by a decrease in its radiographic density.

Another radiograph taken April 7, 1958, showed a more complete ossification of the callus (No. 4, fig. 3) and almost complete necrosis of the original fragment.

In view of the foregoing, it is our contention that at the time of the fracture the periosteum of the diaphysis, or a portion thereof, of the left femur was torn from the bone and remained viable at the areas of the previous muscular attachments. This

Fig. 3—Radiograph taken four months after surgery. The fragment (No. 3) has lost density as the callus has become more dense and is beginning to lose its curvature and conform to the extremities of the bone.

This lower pin was seated firmly, retracted ¼ inch, and then cut as close as permissible. The pin was then forced up-

provided a matrix for the formation of the callus which bridged the disintegrating shaft.

Promazine—Its Pharmacological and Clinical Effects in Horses

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THE RECENT introduction of chemical compounds that favorably modify mood and behavior has provided a valuable adjunct in the treatment of neurotic and psychoneurotic human patients. These drugs, classified as "ataraxics," act on the lower nervous centers—the thalamus, hypothalamus, and reticular formation—instead of the cerebral cortex, the site of action of the older depressants.

The Rauwolfia derivatives and chlorpromazine have been used extensively in the psychiatric field, but later recognition of their inherent drawbacks has tempered enthusiasm. Many reports on the toxicity of both drugs have appeared in the medical literature.[4,7,14,18]

The veterinary literature, too, contains many references[3,6,9,12,19,20] to the use of both Rauwolfia derivatives and chlorpromazine. The reports of toxicosis do not compare with those in human medicine, but the extent and intensity of side effects have been mentioned. Recent reports on meprobamate (a propanediol derivative)[8,10] indicate its desirability in small animal medicine for the tranquilization of hyperexcitable, nervous, or unruly dogs by the reduction of anxiety and tension; however, because of its poor solubility in water, it must be given orally.

Promazine hydrochloride (Sparine*), another member of the phenothiazine series, has been described in the veterinary literature, and its clinical effects in horses,[15,17] cattle,[15] swine,[13] and small animals[2,5,10,11] have been reported.

TABLE I—Results of Blood Studies on a Gelding (950-lb., 7-yr.-old) After Administration of Promazine

Promazine (date)	Promazine (i.v. dose)	Date blood drawn (1957)	Hemoglobin (Gm./-100 cc.)	Erythrocytes (millions/-cmm.)	Hematocrit reading (%)	Leukocytes (thousands/-cmm.)	Neutrophils (%)	Lymphocytes (%)
		2-13	14.4	8.2	41	10.5	50	50
		2-15	13.0	7.8	41	9.2	54	46
2/18/57	500 mg.							
		2-19	17.5	7.8	46	12.7	10	90
		2-20	13.0	9.1	43	9.3	45	55
2/21/57	500 mg.							
		2-21	14.5	7.9	41	9.2	40	60
		2-22	18.3	9.8	47	9.2	40	60
2/23/57	500 mg.							
		2-23	17.2	9.0	45	9.2	40	60
		2-25	16.6	11.2	45	9.2	40	60
2/26/57	500 mg.							
		2-26	15.9	10.7	43	9.2	40	60
		2-27	14.5	9.1	43	8.1	56	44
2/28/57	500 mg.							
		2-28	17.0	11.5	46	8.1	56	44
		3-1	15.9	10.4	43	9.0*	54	43

*Three per cent were eosinophils.

Studies on the general pharmacological properties of promazine in the common laboratory animals show it to be a short-acting depressor, blocking or reversing the characteristic response to epinephrine without respiratory effect when used in therapeutic doses. The taming effect of promazine on monkeys is predictable and consistent, and differs from that produced by chlorpromazine in that the taming is not masked by depression, and recovery from promazine is more rapid.[16] Agranu-

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*Sparine (gamma-dimethylamino-n-propyl phenothiazine hydrochloride) is produced by Wyeth Laboratories, Inc., Philadelphia, Pa.

TABLE 2—Results of Blood Studies on a Gelding (950-lb., 6-yr.-old) After Administration of Promazine

Promazine (date)	(i.v. dose)	Date blood drawn (1957)	Hemoglobin (Gm./-100 cc.)	Erythrocytes (millions/-cmm.)	Hematocrit reading (%)	Leukocytes (thousands/-cmm.)	Neutrophils (%)	Lymphocytes (%)
		2-13	12.5	7.5	43	13.7	45	55
		2-15	17.0	8.2	46	11.5	40	60
2/18/57	500 mg.							
		2-19	17.5	8.8	49	10.6	12	88
		2-20	13.5	9.9	44	7.5	50	50
2/21/57	500 mg.							
		2-21	13.7	7.3	42	12.1	40	60
		2-22	16.4	8.0	42	12.1	40	60
2/23/57	500 mg.							
		2-23	13.2	7.3	38	12.1	40	60
		2-25	16.1	10.9	44	12.1	40	60
2/26/57	500 mg.							
		2-26	15.5	10.5	42	12.1	40	60
		2-27	15.6	8.9	43	12.1	40	60
2/28/57	500 mg.							
		2-28	14.8	10.0	40	12.1	40	60
		3-1	16.6	11.2	45	10.5	55	45

TABLE 3—Case Reports on 20 Horses Tranquilized with Promazine

Case No.	Animal	Age (yr.)	Weight (lb.)	Clinical problem	Medication	Observations
Promazine in routine handling						
1	Thoroughbred filly	3	900	High voltage roentgen therapy for osteoarthritis of carpus; would not stand quietly.	500 mg. diluted with saline solution to 30 cc.; i.v. over 5-min. period.	Noticeable depression; no change in pulse or respiration; hemoglobin normal before, immediately after, and 10 days later; no side effects; response satisfactory.
2	Thoroughbred gelding	4	900	High voltage roentgen therapy; would not stand quietly.	500 mg. i.v. over 3-min. period every other day for 5 treatments.	Became quiet, depressed, penis protruded, head held low; effects apparent after 5 minutes and lasted 2 hr.; no side effects; response good.
3	Thoroughbred gelding	5	1,000	Preparation for television appearance.	500 mg. i.v., adm. rapidly, repeated on 2 successive days.	In 5 min., eyes dull, head low, penis protruding; easily handled before TV camera and lights; no side effects; accumulative effects of drug over 3-day period, but response and recovery excellent.
4	Thoroughbred gelding	5	1,100	High voltage roentgen therapy for arthritis of fetlock joints.	500 mg. i.v. over 2-min. period, repeated every other day for 5 treatments.	Typical response; hemoglobin normal at beginning and 12 days later; no side effects.
5	Thoroughbred gelding	9	1,050	High voltage roentgen therapy for bowed tendons left front leg; refused to stand quietly in therapy stall.	500 mg. i.v. at 5-day intervals for 3 treatments.	Usual effects; horse stood quietly; no side effects; satisfactory response.
6	Thoroughbred mare	5	1,050	High voltage roentgen therapy for ringbone; would not stand quietly in therapy stall.	500 mg. i.v. in 1 min. before each of 3 treatments at 2-day intervals.	Typical response in 5 min.; slight increase in pulse and respiratory rates 15 min. after adm.; no change in hemoglobin content, etc.
7	Thoroughbred gelding	5	1,000	High voltage roentgen therapy of bowed tendons both front legs; would not stand quietly in therapy stall.	500 mg. i.v.	Typical effects but not until 20 min.; stood quietly during therapy.
Promazine as an adjunct to anesthesia						
8	Thoroughbred horse	5	1,100	Surgery on carpus.	500 mg. i.v.; 7% chloral hydrate i.v.	Typical response, but resisted being placed on operating table; no appreciable reduction in amount of chloral hydrate required for surg. anesthesia; no side effects; routine recovery.

(Continued on next page)

TABLE 3 (continued)—Case Reports on 20 Horses Tranquilized with Promazine

Case No.	Animal	Age (yr.)	Weight (lb.)	Clinical problem	Medication	Observations
9	Thoroughbred mare	4	950	Surgery on bone spavin; resisted efforts to prepare operative site.	500 mg. i.v.; local anesthetic.	Response to promazine in 5 min.; operation performed with mare in standing position; no side effects; routine recovery.
10	Thoroughbred filly	2	950	Removal of bone chip in left carpus.	500 mg. i.v.; surg. anesthetic 800 cc. of 7% chloral hydrate sol. i.v. and local infiltration of 2% procaine hydrochloride.	Typical effects; little resistance to being placed on operating table; recovery from anesthesia shortened considerably and less stormy with use of promazine.
11	Thoroughbred mare	4	900	Removal of an exostosis of right carpus.	500 mg. i.v.; surg. anesthetic 500 cc. of 7% chloral hydrate sol. i.v., and local infiltration with 2% procaine hydrochloride.	Typical response in 5 min.; no resistance to being placed on operating table; no side effects; routine recovery.
12	Thoroughbred colt	3	1,100	Surgical correction of fracture of base of medial sesamoid of rt. foreleg.	500 mg. i.v.; surg. anesthetic 1,075 cc. of 7% chloral hydrate sol. i.v. and local infiltration with 2% procaine hydrochloride.	Typical response but resisted effort to place him on table; no side effects; routine recovery.
13	Thoroughbred colt	3	900	Surgical correction of a chip fracture of third carpal bone rt. leg.	500 mg. i.v.; surg. anesthetic 1,300 cc. of 7% chloral hydrate i.v. and local infiltration with 2% procaine hydrochloride.	Typical response in 5 min.; no resistance; no side effects; routine recovery.
14	Thoroughbred colt	2	800	Surgical correction of chip fracture of abaxial surface of medial sesamoid of rt. foreleg.	500 mg. i.v.; surg. anesthetic 200 cc. of 7% chloral hydrate sol. i.v. and local infiltration with 2% procaine hydrochloride.	Usual effects in 5 min.; no resistance; no side effects; smooth recovery.
15	A Hunter gelding	7	1,100	Trephination of rt. maxillary sinus.	500 mg. i.v.; surg. anesthetic 700 cc. of chloral hydrate i.v. and local infiltration with 2% procaine hydrochloride.	Usual effects in 5 min.; no resistance; no side effects; recovery uneventful.
16	Quarter horse gelding	3	900	Removal of tumor from dorsal surface left hindleg distal to stifle; resisted efforts to prepare operative site.	500 mg. i.v.; anesthetic 2% lidocaine HCl.	Typical response in 5 min.; operation performed with horse in standing position; slight resistance during surg.; no side effects; recovery smooth.
17	Saddle horse	4	1,250	Removal of tumor of left ear; resisted efforts to prepare operative site.	500 mg. i.v.; local infiltration with 2% procaine HCl.	Typical response in 5 min.; operation performed with horse in standing position; no side effects; recovery normal.
18	Thoroughbred gelding	3	1,000	Surgical correction of fracture of medial sesamoid rt. foreleg.	500 mg. i.v.; surg. anesthetic 700 cc. of 7% chloral hydrate sol. i.v. and local infiltration with 2% procaine HCl.	Typical response in 5 min.; no resistance; recovery uneventful.
19	Thoroughbred gelding	4	1,000	Surgical correction of fracture at base of lateral sesamoid left foreleg.	500 mg. i.v.; surg. anesthetic 570 cc. 7% chloral hydrate i.v. and local infiltration with 2% procaine HCl.	Typical response; walked unsteadily to operating room; no resistance; recovery normal.
20	Standardbred colt	2	850	Cryptorchid castration.	500 mg. i.v. over 2-min. period; anesthetics for surg. proc. 7% chloral hydrate sol. (21 Gm.) i.v. and local infiltration with 2% procaine HCl.	In 5 min. typical effects on head, eyes, ears, and penis; became slightly unsteady on legs; approx. 40% less chloral hydrate required than usual; colt could stand at completion of operation and walked to stall with assistance; complete recovery from analgesia and anesthesia after 8 hr.

locytosis has been reported in only 18 of some 3½ million human patients who have received the drug.[1] However, because of the liability of the hematopoietic system of the horse, the authors believed that equine blood studies should be made prior to general use of this compound in the clinic.

TOXICITY EXPERIMENTS AND CASE REPORTS

Two, 950-lb. geldings, 6 and 7 years old, were given 500 mg. of promazine i.v. three times a week for two weeks. Blood samples were taken twice before the first dose and daily during treatment (tables 1, 2). The pulse and respiratory rates were taken ten minutes before each administration of promazine, ten minutes after, every 15 minutes for one hour, and then at two-hour intervals for six hours.

These rates showed a slight decrease at ten minutes after administration, followed by a gradual increase, and reached a maximum 45 minutes after promazine was given. Then the pulse and respiration gradually returned to normal three hours after the promazine was administered.

These responses always followed the same pattern, but the degree varied from day to day. The decrease in the normal pulse rate varied from 10 to 25 per cent and, in the respiratory rate from 10 to 20 per cent. The increase in pulse rate varied from 33 to 50 per cent and, in the respiratory rate, from 15 to 30 per cent.

Ten minutes after the administration of promazine, each horse stood quietly in the stall with head lowered, eyes with dull expression, ears drooping, and penis relaxed and protruding from the sheath. For about one hour, they were neither startled by loud noises or sudden movements nor were they interested in feed. Then they became alert and moved about but the penis remained protruding for three hours.

A 900-lb. Standardbred mare, 7 years old, and a 600-lb. Saddlebred yearling, 1 year old, were given promazine intramuscularly daily for three days. Blood samples were taken before each dose, and three days after the last dose was administered. No change was found in the hemoglobin content, erythrocyte count, or cell volume, and the effects on the leukocyte and differential counts were not consistent.

Twenty horses were treated in the large animal clinic at the University of Pennsylvania Veterinary Hospital (table 3). Some of the patients required only local therapy; others required surgical procedures. Promazine was given to horses in both groups and excellent response to medication was obtained in all the patients. There were no side effects, and recovery was uneventful in all instances.

SUMMARY

Promazine hydrochloride (Sparine) in repeated doses of 500 mg. intravenously or intramuscularly over a two-week period produced no significant changes in hemoglobin content, erythrocyte count, or blood cell volume in 4 horses. Some slight decrease was found in the leukocyte count, with a relative increase in lymphocytes and a decrease in neutrophils.

Clinically, horses respond to promazine by showing relaxation and lessened anxiety while retaining awareness of their environment. As a preanesthetic agent, it markedly reduces the dose of anesthetic required for surgery. Its effect of reducing the animal's aggressiveness or fear during simple therapeutic procedures is advantageous to animal, owner, and operator.

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Promazine as a Preanesthetic Agent in Horses

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To induce more satisfactory and safer anesthesia, the adjunctive use of preanesthetic drugs has gained wide acceptance in both human[1,4,7,9,10] and veterinary medicine.[2,3,6]

Several depressants and narcotics have been employed but the more recently developed group of ataraxics has shown greater promise because, in general, calmness and muscular relaxation develop without depression of the higher cortical centers.[5,8,11] However, dosage and extent and uniformity of effects of the several tranquilizing drugs vary considerably; thus, all of these compounds are not satisfactory for use in horses.

The results of our previous studies[8] indicated that promazine hydrochloride (Sparine*) was the ataractic drug of choice because of consistent response of patients and adequate degree of tranquillity induced.

To continue our clinical investigation of this drug, 200 horses were given promazine as a preanesthetic agent before their placement on the operating table for various surgical procedures. Each horse was given an intravenous dose calculated at 0.5 mg. per pound of body weight ten to 15 minutes before being taken to the operating room. In most instances, the total dose was 500 mg.** The maximum drug effects were noted within 15 minutes. On occasion, some incoordination of gait could be detected but none of the horses "went down." Without additional medication, and with little or no struggling, the horses were placed on the operating table by means of foot ropes, head restraint, abdominal girths, and tail ropes.

Except for abdominal surgery or repair of long bone fractures, our equine patients are not subjected to the surgical stage of anesthesia. Instead, the general anesthetic agent is administered to bring the horse to the stage of narcosis where there is little or no resistance to the restraint apparatus and prone position. Narcosis is always combined with local or regional anesthesia of the surgical area. This procedure allows the use of less general anesthesia and the horse will recover more rapidly.

We prefer, as a general anesthetic agent, 7 per cent chloral hydrate solution administered intravenously until nystagmus is detected. Then physiological saline solution, given slowly, is substituted in order to keep the needle open. If additional anesthetic solution is required, the anesthetist can quickly change back to the chloral hydrate.

Anesthesia charts, kept by the anesthetist for each horse, indicate that when promazine is used approximately 40 per cent less of the intravenous anesthetic is required to maintain anesthesia in the horse during surgery. Occasionally, an anesthetized horse may struggle, interfering with good surgical technique; in these

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*Sparine (gamma-diemethylamino-n-propyl phenothiazine hydrochloride) is produced by Wyeth Laboratories, Inc., Philadelphia, Pa.

**Because promazine is incompatible with blood, care must be taken not to draw blood into the syringe, resulting in a gummy solution. To avoid this, the hypodermic needle is inserted into the jugular vein in the direction of blood flow. If blood is aspirated into the syringe, it is immediately returned to the circulation before being dispersed throughout the promazine.

patients, more anesthetic is administered. After completion of the surgical procedure, the horse is removed from the operating table and put in a recovery stall.

ADVANTAGES OF PROMAZINE

Before the use of promazine, the recovery stage lasted one to four hours, or longer. It was frequently marked by numerous efforts by the horse, in the beginning unsuccessful, to regain the standing position, resulting in self-inflicted wounds of the legs, head, or body. Struggling sometimes was accompanied by an excitement phase wherein the horse would show a variety of running movements, also frequently resulting in self-inflicted trauma.

The use of promazine has nullified almost all of the undesirable activity associated with recovery. The horse lies quietly in the recovery stall until he is able to regain the standing position. When an effort to rise is unsuccessful, it usually causes no trauma because of the general muscular relaxation induced by promazine. Recovery is also more rapid; usually, the horse is standing within one hour or less after removal from the operating table.

The sooner the horse regains the standing position the better, for resumption of normal posture minimizes self-traumatization and other effects of prolonged proneness. Preanesthetic administration of promazine also saves time and work for the professional staff and lay assistants.

SUMMARY

As preanesthetic medication in the horse, the preferred dose of promazine is 0.5 mg. per pound of body weight given intravenously. Maximum tranquilizing effects are reached within 15 minutes. The subsequent amount of intravenous chloral hydrate solution required for narcosis is reduced by approximately 40 per cent. The recovery phase is free of excitement and struggle; horses regain the standing position usually within an hour.

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Arterial Thrombosis with Gangrene After Use of Promazine Hydrochloride.—Unusual complications resulted from intravenous injection of promazine hydrochloride in two patients suffering from alcoholism. It was believed that the arterial spasm and thrombosis in these patients might have been due to infiltration of the promazine into the soft tissues or, reflexly, through vein irritation from the intravenous injection. Extension to branches of the brachial artery, causing gangrene in the hand in one person and gangrene in the third finger in the other, may have been due to this mechanism.

It is suggested that promazine be used with caution or perhaps not at all via intravenous route.—*J.Am.M.A. (Nov. 1, 1958):1224.*

The Sexual Activity of Mules.—Testicles of mules are relatively somewhat smaller than in horses or donkeys; there are fewer winding tubules (tubuli contorti); and spermatogenesis usually terminates at the stage of spermiocytes. In mare mules, the estrous cycle averages 20.3 days and estrus 3.84 days. The ovarian follicle does not always rupture. The wall of the uterus has few muscle elements and the superficial layer of the ovaries often forms "an active crust."—*J. Becze in Magyar allatorv. Lap. (Sept., 1958):237.*

Report on Finger-Electrode Electroejaculator

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IT IS ESTIMATED that more than 25 per cent of the bulls used for artificial insemination are eliminated for physical reasons and that half of these might be used satisfactorily if semen could be collected by electroejaculation, thus not requiring simulated copulation.

Several commercial models of electroejaculators are available. They are expensive, elaborate, and leave much to be desired. One of them consists of a hard rubber or a plastic rectal probe with alternating bipolar strips or rings for electrodes. These electrically stimulate the anatomic structures surrounding the rectum and they affect the musculature of the hindquarters, even to the extent of producing tetany and temporary paralysis.

Bulls which are stimulated improperly are reported to bellow excessively, even in the absence of pain.[3] This general and extreme stimulation probably can not be entirely avoided with commercial rectal probe-type ejaculation.

An electroejaculator with finger electrodes,[4] designed and constructed[5] for us, is a great improvement over the rectal probe-type. With it, undesirable stimulation of the hindquarters can be avoided almost entirely. Ringlike electrodes, slipped onto the index and middle fingers of the gloved hand at levels which will avoid their coming in contact (fig. 1) and thus closing the circuit, are placed in the rectum and brought in contact with the dorsal surface of the base of the penis and accessory glands, with the hand inserted until the wrist is in the anus.

The electrodes are copper rings soldered to a thin flexible wire extension cord and shaped to fit the fingertips. The cord is attached to a control unit containing a step-down transformer, ammeter, voltmeter, fuses, and a variable rheostat that operates on ordinary 115-watt house current. Commercial units now in use can be modified by merely substituting the finger electrodes for the rectal probe.

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The use of this finger-electrode equipment is not limited to the bull which is unable to use an artificial vagina, for either physical or psychological reasons; this technique has been used successfully on bulls which repeatedly fail to ejaculate when stimulated with the rectal probe.[5]

The writers have salvaged, for breeding purposes, a 16-year-old bull which is apparently normal but is unable to support his own weight on his hindlimbs and will not attempt to mount. Although this bull had not mounted a cow since November, 1956, 48 electroejaculations were collected from him during 1957, at intervals of one to ten days. The amount of semen varied from 6 to 15 cc. (av. 9 cc.) and the concentration and motility varied only a slight degree, being rated as fair and good.

The calf crop represented 31.4 per cent of the services for the first half of 1957 as compared to 29.7 per cent for a previous six months when the bull was used regularly with a mount and artificial vagina. This would seem to confirm the report[2] that electrical stimulation has no adverse effects on the viability of the bulls' sperm. By November, 1958, we had collected semen from this bull by electrical stimulation for two years.

COLLECTION TECHNIQUE

The results obtained with an electroejaculator will vary with the skill of the operator and the manner and frequency of handling the bull. In general, these instructions should be followed:

1) Don't excite the bull prior to collection.

2) When possible, bring a cow in heat into close view to increase libido and, in some cases, to stimulate the bull to drip semen and thus eliminate some of the accessory fluid.

3) Restrain the bull by securing his head and limiting his lateral movement via chute or stall; clip the prepuce, wash and dry the area about the os, and douche the sheath cavity with a pint of warm water using a horse catheter.

4) Use an artificial vagina (fig. 1) with a collection vial attached and enclosed in a clear plastic jacket containing warm water (95 to 105 F.). A short vagina may be desirable at first but, with subsequent collections, a complete erection can be expected and the regular length artificial vagina may be necessary.

Fig. 1—Equipment used in collecting semen by electroejaculation: control unit (A); cone of artificial vagina (B); collection tube with water jacket of a short artificial vagina and gloved hand of the operator with finger-electrodes in position for use (C).

5) Have one person handle the finger electrodes and operate the control unit, with a second person holding the collecting apparatus and observing the nature of the ejaculation.

6) Apply a voltage of 3 to 10 volts at 3- to 4-sec. intervals. This will produce rhythmical contractions or pulsations of the urethral muscles. The same results can be obtained with a constant voltage if contact of the finger-electrodes to the base of the penis is applied rhythmically. This latter approach is simpler and less taxing to the operator.

7) Examine the sample immediately and, if not completely satisfactory, collect a second sample in a few minutes.

DISCUSSION

Actually, the amount of voltage needed to cause erection is variable and the operator is guided by the response of the bull's genitalia to the stimulation. Higher voltages, perhaps 20 to 30 volts, are necessary for protrusion of the penis and ejaculation. Synchronizing the stimulation interval to the rhythmical pulsations of the urethral muscles and occasionally carrying the finger-electrodes forward to the seminal vesicles may improve the operation.

Occasionally, it may be desirable to straighten out the S-curve of the retracted penis while stimulating by a manual downward and forward massage between the thighs with the control unit hand. This will cause the semierect penis to protrude into the warm lubricated artificial vagina and result in an ejaculation. This is preferable to increasing the voltage. If the animal seems tired, wait an hour or more before repeating.

The clear plastic water jacket enables the operator and his assistant to observe the nature of the collection throughout the process. Thus, if the forepart of the collection is thin, watery, and apparently seminal fluid for the most part, it can be discarded before continuing.

SUMMARY

The finger-electrodes method of applying the electroejaculation technique has been successfully used routinely in collecting semen from bulls which are incapable of mounting a cow or dummy.

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Gastroenteritis of Nursing Pigs.—In 1958, in Ontario, a disease of nursing pigs first seen in 1957 and characterized by vomiting, anorexia, constipation, and severe emaciation reached epizootic proportion. When compared with transmissible gastroenteritis, which has not occurred in Canada, there is considerable similarity and yet marked differences.

In TGE, animals of all ages are affected although fatalities are usually limited to pigs under 10 days of age; in the Ontario disease, nursing pigs of all ages are severe-

ly affected although some of the mothers show a slight transient illness. In TGE, surviving pigs are soon normal; in this disease, there is a long period of inappetence and emaciation, usually resulting in death. In TGE, diarrhea is severe; whereas in this disease, the pigs are usually constipated, diarrhea occurring in only certain herds. Except in acute cases, lesions were seldom seen on necropsy.—*C. K. Roe and T. J. L. Alexander in Canad. J. Comp. Med. (Sept., 1958): 305.*

Dermoid Cyst of the Canine Ovary

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Skokie and Lake Forest, Illinois

One of us (J.F.M.) was asked to examine a female Pointer, 5 years old, because of her poor condition. She had worked well during the hunting season which had just closed. Despite a good diet and appetite, she had become exceedingly thin, though she did not tire in the field.

When first handled, she was lying relaxed on her side and a large, hard mass was felt in the abdominal cavity, just posterior to the ribs. When standing, the mass could not be felt. She had never been mated but her heat periods had been regular and normal.

A lateral radiograph of the dog in a recumbent position verified the presence of the mass and showed it to be located just ventral to the kidney. The enlargement appeared to be dense and to contain some opaque material resembling calcified tissue (fig. 1). Since the mass was not palpable when the animal was standing, an ovarian neoplasm was suspected. The presence of calcium or bone suggested a dermoid cyst (W.H.R. had observed three such tumors previously).

At surgery, a hard, movable tumor, 12 cm. in diameter, was found in the area of, but not attached to, the left kidney. It was enclosed in a heavy fibrous capsule; one side was attached to the ovarian ligament and the other side to the left uterine horn. The right ovary appeared normal, as did both horns of the uterus. There was no evidence of metastases, adhesions, or further abnormalities in the abdominal cavity. The tumorous ovary, the normal ovary, and the uterus were removed. The dog recov-

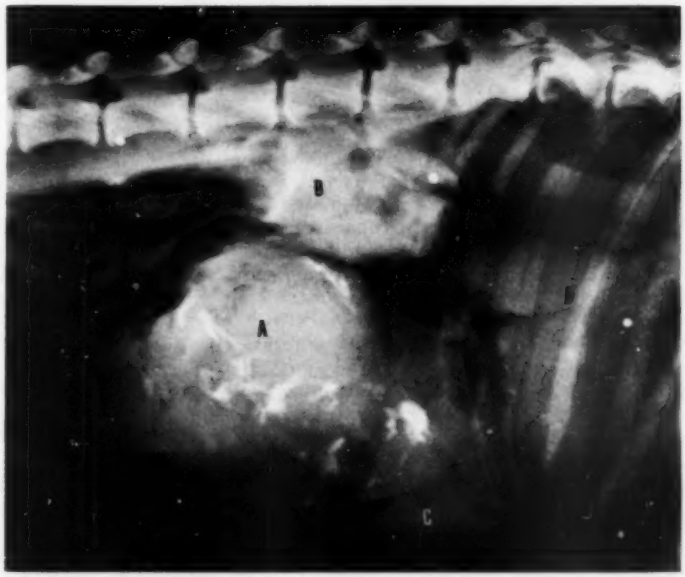

Fig. 1—Radiograph (lateral recumbent view) of a dog, showing a neoplasm containing calcified tissue (A); kidney (B); spleen (C); and liver (D). Several pellets are visible in the radiograph.

Drs. Riser, Guibor, and Oldt are small animal practitioners in Skokie, Ill.; Dr. Marcus is a general practitioner in Lake Forest, Ill.

ered satisfactorily and the normal weight was gradually restored.

DISCUSSION

The irregular mass was hard and rough and, when incised, it contained hair, bone, fat, and skin in cysts (fig. 2). It was identified as a dermoid cyst or teratoma which, for practical purposes, are considered the same type of tumor. These are not common tumors; in our collection of 16 ovarian tumors, this is the fourth with dermoid cysts. The exact origin of this tumor of the ovary is not known. Possible causes are: internal twinning, proliferation of misplaced blastomeres, and developmental anomalies.

In women, these tumors appear at all ages, often in childhood, but most frequently at 30 to 40 years of age. They constitute about 10 per cent of all ovarian tumors, may be benign or malignant, and may be bilateral. Prognosis depends on the nature and complication of the growth and whether it has broken through the capsule.

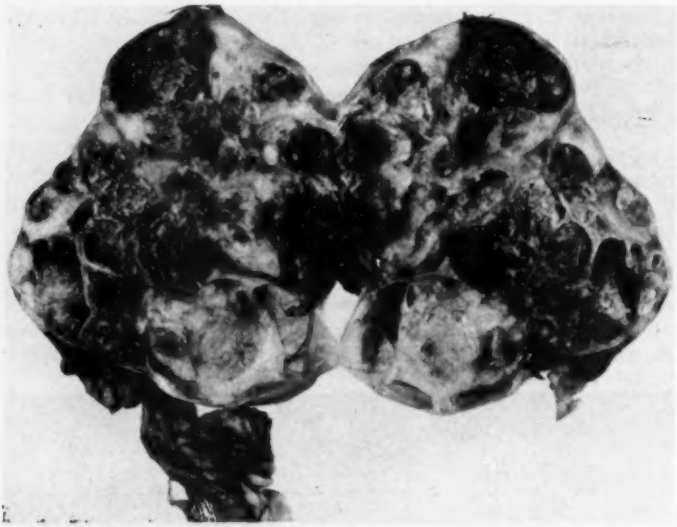

Fig. 2—Neoplasm, a dermoid cyst from a dog, incised to show the presence of hair, bone, fat, and skin. Its attachment to the ovarian horn is also shown (lower left).

Infectious White Scours in Calves

In a large dairy herd, in Britain, many young calves were lost with infectious scours. They had nursed their mothers up to three days before being moved to a special shed. Each was twice treated prophylactically with an anti-scour serum and a sulfonamide. The causative *Escherichia coli* was resistant to all tetracyclines (oxytetracycline had been used prophylactically with success until resistant organisms developed).

Development of the disease was studied by cultures from rectal swabs. Of interest were: the rapidity with which *Esch. coli* replaced the normal coli flora; the correlation of a relapse with an incomplete elimination of the pathogenic organism; and the apparent inefficiency of the proprietary anti-scour serum. Control depended on elimination of the infectious flora from the gut and moving the calf to uninfected quarters.

Elimination of carriers could be accomplished by early weaning plus oral inoculation with normal feces containing fecal streptococci. Where new buildings were used, there was no change of fecal flora unless the calf was given normal feces. Recovered and exposed calves were kept segregated until the pathogenic organism had disappeared from their feces.—*C. M. Gould in Vet. Rec. (Aug. 30, 1958): 697.*

Field Trials of Infectious Bovine Rhinotracheitis Vaccine

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INFECTIOUS BOVINE rhinotracheitis (IBR) was recognized as a disease entity in 1950.[6] Subsequently, the disease was reproduced experimentally[2,5] and the etiological agent, a virus, was isolated.[4] Establishment of the cultivability of IBR virus in tissue culture resulted in development of a vaccine. This is a report of an early experiment with two commercial vaccines, followed by a field test with the same products.

The preliminary tests were conducted on the research farm of the College of Veterinary Medicine, Colorado State University, Fort Collins, Colo., and the field tests were carried out in feedlots of northeastern Colorado.

MATERIALS AND METHODS

Initial Trials of Vaccines.—Two groups of 30 Hereford cattle each were used; one to test the efficacy of vaccine A (Rhivax*) and the other for vaccine B (Bocine*). Each group of 30 animals was divided into three lots of 10 animals each. They were fed a standard fattening ration for 30 days before the start of the experiment.

Each animal in lot 1 was given 2 ml. of the vaccine (modified live virus) intramuscularly. The animals of lot 2 were not vaccinated and were penned with animals of lot 1 to serve as "contact" controls. Animals of lot 3 were not vaccinated and were penned separately at some distance from lots 1 and 2 to serve as "isolated" controls.

Three to four weeks later, each animal was challenged intratracheally with 5 ml. of nasal washings from infected cattle, the virus titer of which was approximately 400 tissue culture infective doses ($10^{3.6}$t.c. $i.d._{50}$). The challenge material had been made bacteria-free by centrifugation, and had been blind-passaged through various routes in chicken embryos, mice, and guinea pigs without revealing any viral activity.

All of the animals were observed daily, during the entire experiment, for temperature and clinical changes.

Field Trials.—A total of 9,703 cattle in 40 feedlots was used; all the premises had previously been infected with IBR. Modified live virus vaccine was given to 4,326 animals: vaccine A to 2,500 cattle in 22 feedlots, and vaccine B to 1,826 animals in 18 feedlots. The dosage was 2 ml., given intramuscularly within one week after arrival of animals in the feedlots. As controls, 5,377 animals were left unvaccinated in the same pens with the vaccinated animals. Diagnosis of IBR was based on clinical signs of the disease.

In addition, 787 cattle were used to test the efficacy of vaccines after the cattle had been on feed for 30 days. Vaccines A and B were each given to 258 animals, and 271 were used as unvaccinated controls. All of these animals had been exposed by contact to other pens of cattle which were known to be infected with IBR.

RESULTS

Initial Trials.—The results of these trials are given (table 1). Some vaccinated animals showed a mild thermal reaction for only one or two days, with no reduced feed consumption. Four weeks after vaccination, these animals were challenged with nasal washings from infected cattle. Some of the vaccinated animals showed mild thermal responses, while the majority of the unvaccinated animals showed typical clinical signs of IBR, such as high fever, excessive nasal discharge, dry cough, increased rate of respiration, and inappetence.

Vaccine A gave complete protection, following challenge, to 6 of the 10 animals. The other 4 showed only a mild febrile response. On the other hand, 9 of 10 animals in each of the two control groups showed typical clinical signs of the disease.

Vaccine B produced similar protection against IBR. Upon challenge with the virus, 7 of 10 vaccinated animals were clinically protected, 3 showed a mild febrile reaction, and 16 of the 20 control animals developed typical clinical signs of IBR.

Field Trials.—In this series of tests, where challenge was not possible, the disease did not occur in 11 of the 22 feedlots in the experiment using vaccine A, or in 11 of 18 feedlots in the experiment using vaccine B. This left 11 feedlots in the vaccine A experiment and 7 feedlots in the vaccine B experiment for evaluation of vaccine efficacy (table 2).

With vaccine A, 16 of the 1,575 vacci-

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*Rhivax is produced by Pitman-Moore Co., Indianapolis, Ind.; Bocine is produced by Cutter Laboratories, Berkeley, Calif.

TABLE 1—Results of a Control Trial of Infectious Bovine Rhinotracheitis Vaccine in Cattle

	Vaccinated	"Contact" controls	"Isolated" controls
Vaccine A			
Reacted from vaccination	9/10*	3/10	0/10
Reacted from challenge	4/10	9/10	9/10
Vaccine B			
Reacted from vaccination	5/10	1/10	0/10
Reacted from challenge	3/10	9/10	7/10

*Numerator indicates number of animals showing reaction, denominator number of animals used.

nated cattle developed IBR, while 140 of 2,762 unvaccinated animals showed signs of the disease. With vaccine B, 16 of the 1,400 vaccinated animals developed clinical IBR, while 120 of the 1,871 unvaccinated animals showed signs of the disease.

In the group of 787 cattle which had been exposed in the feedlot for 30 days before some were vaccinated, 54 of the 258 animals given vaccine A, 47 of the 258 given vaccine B, and 60 of the 271 unvaccinated animals showed signs of IBR.

DISCUSSION

In the northeastern area of Colorado, the morbidity due to IBR in feedlots was reported to have been an average of 18 per cent.[1] From the results of this current study, approximately 1 per cent of vaccinated and 5 per cent of unvaccinated animals in the feedlots developed clinical signs of IBR. In some pens of cattle, up to 18 per cent of the unvaccinated animals manifested the disease, but 0 to only 3 per cent of the vaccinated cattle contracted IBR. It therefore seems that these modified live virus vaccines are effective.

TABLE 2—Results of a Field Test of Infectious Bovine Rhinotracheitis in Cattle in Colorado Feedlots

		Vaccinated animals		Control animals	
	Feedlot	Total	No. sick on challenge	Total	No. sick on challenge
Vaccine A					
	1	100	3	185	37
	2	100	0	190	2
	3	110	2	195	16
	4	292	2	290	6
	5	108	2	113	3
	6	105	0	722	20
	7	75	1	75	0
	8	56	0	57	5
	9	250	1	285	0
	10	150	1	170	21
	11	229	4	480	30
Totals		1,575	16	2,762	140
Morbidity			1.01%		5.07%
Vaccine B					
	1	223	8	223	30
	2	292	0	290	6
	3	105	2	113	3
	4	305	2	306	9
	5	150	1	264	25
	6	200	0	500	16
	7	125	3	175	31
Totals		1,400	16	1,871	120
Morbidity			1.14%		6.41%
Grand total		2,975	32	4,633	260
			1.08%		5.61%

It appears that cattle should be vaccinated as soon as they are brought into the feedlot. The disease seldom occurs until the cattle have been on feed 14 days or longer.[3] In this study, the animals vaccinated after being on feed for 30 days showed signs of infection within two days, indicating that they were in the incubation stage at the time of vaccination. The results of this phase of the experiment show that modified live virus vaccine is not indicated as a means of prevention or treatment once the disease is established in a group of animals. It did not, however, increase morbidity or severity of the infection. Proof of its safety is demonstrated by the lack of infection developing in many feedlots in which half of the animals were vaccinated. No infection occurred in 11 of 22 pens in which vaccine A was used or in 11 of 18 in which vaccine B was used.

It is of interest (table 1) that 3 of 10 "contact" control animals had a mild transitory febrile reaction a few days after other cattle in the pen had been given vaccine A. One of 10 "contact" control animals had a similar reaction to vaccine B. The cause of this reaction is not clear, but it is evident that an appreciable degree of immunity did not accompany the reaction because 18 of the 20 cattle developed clinical signs of IBR when later challenged with the virus.

This experiment was not designed to test duration of immunity following vaccination with modified live virus, but animals on feed for six months following vaccination did not show clinical manifestations of IBR.

SUMMARY AND CONCLUSIONS

Results are presented on the use of infectious bovine rhinotracheitis (IBR) modified live virus vaccine under controlled experimental conditions and under field conditions in northeastern Colorado.

Of 20 experimental cattle given one of two commercial IBR vaccines (Rhivax and

Bocine) 14 showed a mild postvaccinal reaction and all resisted challenge infection later, although 7 of the 20 showed a mild reaction. On similar challenge, 16 of 20 isolated control cattle developed typical IBR.

Of 2,975 vaccinated feedlot cattle, 32 (1.08%) developed IBR when challenged, compared with 260 (5.61%) of 4,633 unvaccinated control animals.

The data support the conclusion that animals should be vaccinated as soon as possible after they are brought into a feedlot in an epizootic area.

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Bluetongue in Sheep

Blood samples from 132 flocks of sheep suspected of having bluetongue were submitted to a bluetongue laboratory. The suspected flocks represented 75,810 sheep. The reported morbidity was 18.4 per cent; the mortality 1.5 per cent.

Bluetongue virus isolations were made on 48 occasions from flocks located in 14 southwestern states. Reciprocal cross protection tests using 12 virus isolates and 104 test sheep, that had recovered from clinical bluetongue, showed that all isolates were of one strain.

From nine states, blood or serum samples were taken from cattle, some of which were in contact with sheep from which bluetongue virus was isolated. Although sheep were inoculated with the bovine blood samples and subpassages made, bluetongue virus was not recovered. The sheep later reacted to challenge inoculations using the known virus. To date, bluetongue virus has not been isolated from cattle at the laboratory.—*McCrory et al. in U.S. Livestock San. A., Proc. of 61st ann. meet. (Nov. 13-15, 1957):271.*

Bluetongue in Spain.—An epizootic of bluetongue in Spain lasted from August to November, 1956, with 60 to 80 per cent of affected sheep dying. About 132,000 sheep and 9 cattle were believed to have died with the disease. Nearly 8 million sheep and 50,000 cattle were vaccinated with a tetravalent vaccine.—*(Bull. Off. internat. Epizoot., 48:605-611) abstr. in Vet. Bull. (Oct., 1958): Item 3230.*

Salmonella Arthritis in Chickens

In three flocks of broiler chickens, in Britain, in which arthritis was a common problem, a variant strain of *Salmonella pullorum* was found to be responsible for the lesions.

When a crude emulsion of the orange-colored periarticular tissue was injected intravenously into 4 chicks, 1 month old, all developed orange-colored nodules at the inoculation sites and died within 18 days; *S. pullorum* was isolated from their livers.

When cultures of the isolate were fed to 12 chickens, 4 days old, 3 died within 16 days with enlarged livers and spleens; the variant *S. pullorum* was recovered from these organs in each bird. Of the remaining 9 birds, 2 developed swollen joints, 3 were unthrifty, while 4 developed normally.—*R. B. A. Carnaghan and W. J. Sojka in Vet. Rec. (Aug. 9, 1958): 645.*

Persistent Reactions to Leptospirosis.—Seven annual blood tests of 130 to 160 animals in an artificial insemination stud, in New York, show that positive agglutination-lysis titers of 1:200 to 1:1,000 may persist in an animal for at least seven years. Illness due to leptospirosis has never been diagnosed in this herd.

These findings further indicate that such titers can confuse a diagnosis. The only means of accurately diagnosing leptospirosis are (1) recovery of Leptospira from the blood during acute illness, or from the urine following an acute attack; and (2) finding a negative blood test at the time of acute illness with a rising positive titer on subsequent tests.—*S. J. Roberts in Cornell Vet. (Oct., 1958): 363.*

Spina Bifida with Myelomeningocele in a Calf

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Davis, California

SPINA BIFIDA (cleft spine) is a congenital anomaly of the spine characterized by incomplete fusion of the laminae to form the vertebral arch. Depending on the relative involvement of mesenchymal and neural tissues, several forms are recognized:

(1) Spina bifida occulta, one of the most common anomalies of man, is the simplest type where fibrous connective tissue replaces the bony defect to complete the arch, and only a minor skin blemish may indicate its presence;

(2) Spina bifida with meningocele is characterized by a herniation of the dura mater through the laminar defect as a sac filled with cerebrospinal fluid;

(3) Spina bifida with myelomeningocele is charcterized by the dural herniation and a form of myelodysplasia which frequently results in loss of normal neural function;

(4) Spina bifida with rachischisis is characterized by the superficial occurrence of neurectoderm through a failure in forming the neural tube. Spina bifida is typically located in the lumbar region, but may occur at any point along the vertebral column.

Reports of spina bifida were found for dogs,[5,6] sheep,[4] and cattle.[1,2] This is a report of spina bifida with myelomeningocele in a male Angus calf, 8 days old. Marked flexion of both hindlimbs was observed at birth, and the calf later had a prolapsed anus. It was examined, radiographs were taken, and it was necropsied.

GROSS AND MICROSCOPIC PATHOLOGICAL FINDINGS

Although the calf was alert, it was unable to stand because of flexed contracture of both hindlimbs. A circular skin defect, 5 cm. in diameter, was observed in the region of the tubera sacrale. This defect was reddish, devoid of hair, and fluctuated on palpation. A dorsoventral radiograph showed the incomplete fusion of the neural arches of the last two lumbar and of the sacral vertebrae. A lateral radiograph (fig. 1) showed a marked lordosis in the lumbar region and the position of the contracted limbs.

The forelimbs showed no obvious deformities, and the muscles were grossly and microscopically normal. The muscles of the hindlimbs, however, were atrophic and a dull yellowish white in contrast to the reddish brown muscles of the forelimbs. All of the hindlimb muscles were involved except two medial muscles, the sartorius and part of either the gracilis or adductor. The identity of the remaining muscles was obscured because of the marked atrophy and the close adherence of former muscle masses.

The dura mater was involved in the skin defect and was so adherent that part of it was removed with the skin while exposing the deeper structures. The dorsal fascia was incomplete from the fifth lumbar to the fifth sacral vertebrae. Deep to the fascial defect was a cavity lined by dura mater and bordered by the incompletely formed laminae.

Within the cavity and at the level of the fourth lumbar vertebra, the spinal cord terminated in an atypical cauda equina. A conus medullaris was absent, and the terminal nerve fibers coursed in several directions. Some nerves passed through the intervertebral foramina, while others coursed caudad into the tail and dorsad into the superficial tissues.

The lumbosacral plexuses were dissected and found atypical. With the exception of the sciatic nerves, the individual nerves of the plexuses could not be identified by position or by muscle(s) innervated. Because of the atrophy of the coccygeal muscles, the tail hung limp over the prolapsed anus. The levator ani muscles, which normally prevent the physiological prolapse of the anus during defecation, were atrophic, presumably resulting in the prolapsed anus. No other abnormalities were observed in the digestive, urogenital, or circulatory systems.

The skeleton was prepared by maceration

From the School of Veterinary Medicine, University of California, Davis.

The author thanks Professor P. W. Gregory for supplying this calf, Mr. R. W. Wise for his illustrations, and Dr. T. Hage for his radiographs.

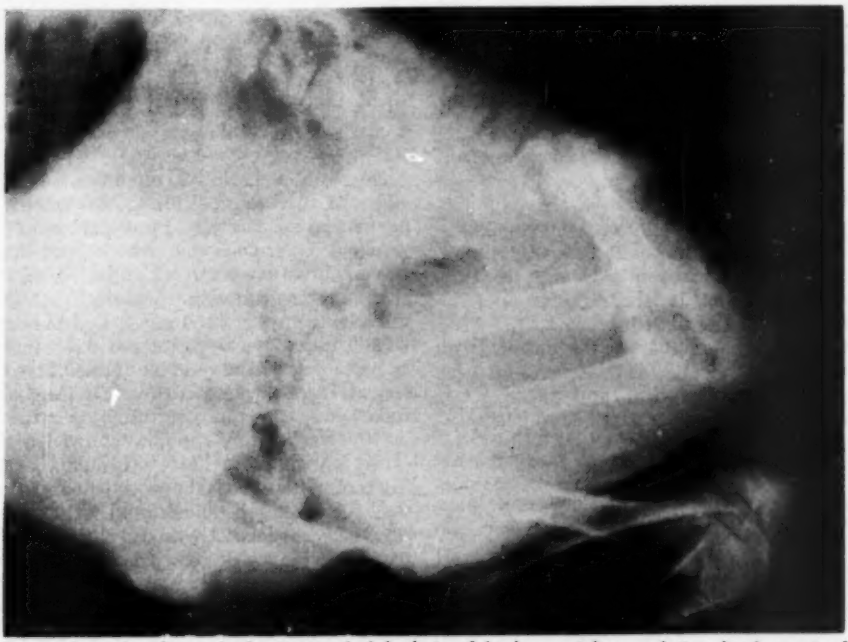

Fig. 1—Lateral radiograph showing marked lordosis of lumbar vertebrae, relative development of dorsal spines, and the position of the contracted hindlimbs in a calf with spina bifida with myelomeningocele.

in a 1 per cent lye solution, and the lumbar and sacral vertebrae are illustrated (fig. 2). From the fifth lumbar to the fifth sacral vertebrae inclusive, there was a failure of laminar fusion. The relative development of the neural arches diminished caudally.

Sections of the terminal spinal cord, sciatic nerves, and both normal and pathological muscle tissue were examined microscopically. The spinal cord showed a typical structure with no pathological alterations. Nerve bundles of the sciatic nerve showed areas of axon degeneration and either demyelination or amyelination. The pathological muscle tissue was devoid of recognizable muscle fibers. Only the sarcolemmal sheaths, many replaced by adipose tissue, remained. Some atrophic muscle fibers were observed in the transitional zone between normal and pathological muscle.

DISCUSSION

The embryological basis of spina bifida may be twofold: (1) a primary defect involving the mesoderm such that the laminar bone is not formed but replaced by connective tissue; and (2) a primary defect involving the neurectoderm such that it suffers dysplasia and secondarily induces a failure in laminar fusion.

Both heredity and environment may be incriminated in this anomaly. An example of hereditary spina bifida was described in a calf.[2] Its sire had sired 3 other calves with a comparable condition, while the dam had delivered 5 normal calves, each sired by a different bull. The influence of *in utero* environment on the production of spina

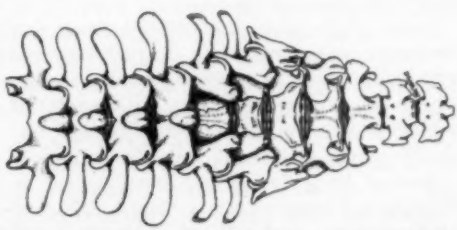

Fig. 2—Dorsal view of the lumbar and sacral vertebrae showing incomplete laminar fusion from the fifth lumbar to the fifth sacral vertebrae, in a calf having spina bifida with myelomeningocele.

bifida was illustrated in the offspring of rats injected with trypan blue. These animals suffered varying degrees of laminar and neural dysplasia.[3]

Neither familial nor environmental factors could be cited as the cause of spina bifida in the calf described here.

SUMMARY

A case of spina bifida with myelomeningocele is reported in a calf. The animal had contracture and marked muscular atrophy of both hindlimbs. Laminar fusion was incomplete from the fifth lumbar to the fifth sacral vertebrae inclusive, the spinal cord terminated atypically at the level of the fourth lumbar vertebra, and there were areas of axon degeneration in the sciatic nerve.

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Sex-Linked Hyperostosis in the Parakeet.—In 1,000 parakeets necropsied since 1955, 20 females, 2 to 4 years old, but no males showed multiple hyperostoses. The skull, sternum, vertebrae, and sacrum were most often affected. The lesions were 2 to 3 cm. in diameter. Some lesions on the retro-orbital bone caused exophthalmos while some on the sacrum caused leg paralysis due to pressure on the nerves.

Some of the birds with hyperostoses had increased endosteal bone in the humerus and femur such as normally occurs in laying birds, indicating that an excess of estrogen may be a causative factor. Experimentally, stilbestrol injections induced endosteal bone formation accompanied by lipemia and hypercalcemia; and in 12 of 27 birds which survived 100 days, hyperostoses developed.—*(Am. J. Path., 34:562) abstr. in Vet. Bull. (Oct., 1958): Item 3451.*

Pseudomonas Mastitis—A Case Report

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On Nov. 6, 1957, a client came to the office to discuss a slight enlargement and hardening of the left hindquarter of a 6-year-old Guernsey cow which was due to calve in two weeks. Two tubes of mastitis ointment containing penicillin (100,000 units), neomycin (150 mg.), and bacitracin (2,200 units) were dispensed with instructions to infuse the quarter immediately and repeat in one week. He was advised not to milk out the quarter until parturition.

One week later, the cow showed a moderate swelling of the left hindleg, extending from 3 inches above the hoof to midway between the hock and stifle joints. She was moderately lame, although there was no evidence of pain when pressure was applied to the swelling. A thorough examination failed to reveal the cause of lameness.

When the cow freshened two days later (Nov. 15), she was extremely lame in the left hindlimb. Although the left hindquarter was markedly swollen and hard, its temperature felt normal. The exudate was extremely thick and yellowish. The rectal temperature was 101 F. and anorexia was complete.

One tube of mastitis ointment was infused and two left for the owner to infuse at 12-hour intervals. Each tube of ointment contained hydrocortisone acetate (20 mg.), penicillin (100,000 units), neomycin (175 mg.), and polymyxin B (50,000 units). The cow was also given 3,000,000 units of aqueous penicillin intramuscularly. Forty eight and 72 hours after the last tube of ointment was infused, 500 mg. of an erythromycin solution was injected intramuscularly.

No improvement was noticed in the next two days. Two tubes of mastitis ointment containing papain (50 mg.), to be used 12 hours apart, were given, and 100 mg. of prednisolone was injected intramuscularly.

Since there had been no improvement

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The author acknowledges the assistance of Dr. R. A. Packer, head of veterinary hygiene, Iowa State College; Dr. L. C. Payne, Pathology Department, University of Nebraska; and Dr. C. M. Hibbs, veterinary clinic, David City, Neb.

during the last five days of treatment, the owner was advised to bring the patient to the clinic. In an effort to raise the leukocyte count (5,500), anti-hog cholera serum (40 cc.) was injected every 48 hours, without success. Daily infusion of the quarter with an ointment containing papain (50 mg.), in an effort to liquify the exudate, was also unsuccessful. The teat orifice was surgically enlarged to facilitate removal of the exudate.

Five days after the cow was admitted to the clinic it was found, by exploratory rumenotomy, that traumatic reticulitis was not a complicating factor. Instead of the routine closure of the incision, a rumen fistula was established.

Two hours after surgery was completed, rumenatory stimulants were administered through the fistula and, in 24 hours, normal rumen motility was re-established after an absence of more than one week. The stimulants were added to a daily ration containing molasses with water to maintain a slightly fluid consistency, and this was given daily through the fistula.

Although the rumen motility was normal, the patient's condition continued to deteriorate. All attempts to influence the udder infection failed. Finally, when the cow was no longer able to get up, euthanasia was performed and immediately, using aseptic precautions, an incision was made and a culture was taken from the upper portion of the udder. A pure culture of *Pseudomonas aeruginosa* was obtained.

DISCUSSION AND CONCLUSION

The body defenses apparently became nonfunctional at the time of parturition, as evidenced by the normal body temperature, low leukocyte count, and the absence of inflammation in the infected quarter.

The breakdown of the defense mechanism resulted in complete failure of all treatments. It demonstrates the impotence of our modern "wonder drugs" when nature removes her defense weapons. The lameness seemed to be associated with the cow's general condition.

Mycotic Mastitis.—Of a number of microfungi, isolated from lesions in the udders of cows and inoculated into the mammary glands of goats and cows, only *Candida pelliculosa, Candida tropicalis,* and Saccharomyces produced a transient mastitis. The inflammation rapidly subsided although the organism could be isolated from the secretion for a considerable time. Only 1 case resembled the natural infection. However, when *C. tropicalis* was injected with 1,000,000 units of penicillin, there was a much greater inflammatory reaction, indicating that the pathogenesis was connected with the antibiotic treatment.

Inoculation with *Cryptococcus neoformans* produced a more marked reaction, even in the absence of antibiotics.—*G. Redaelli in Arch. Vet. Ital. (April 30, 1957)*: 97.

Coliform Cultures for Equine Eczema

Skin disorders in 54 horses were treated with a broth culture of coliform microbes administered orally. Of these, 20 had scurfy chronic eczema of the mane and tail, and 15 recovered completely while 3 improved distinctly and 2 did not respond. Of 14 others with intractable itching, only 1 failed to recover. Of 20 others with a variety of skin ailments (prurigo, urticaria, eruption resembling acne, and eczema), all recovered. Results were more favorable in cases of short duration; only a few recurred.

Treatment, started in each case because the bacterial examination of the feces revealed an abnormal coliform flora, is recommended when skin ailments are linked with such changes.—*J. A. Nilsson in Nord. Vet.-med., 10, (Feb., 1958): 82.*—R. KLUSSENDORF.

Brucella Melitensis in Sheep Dogs

Four different serological tests for brucellosis, on serums from 102 sheep dogs attached to 50 flocks in Europe, revealed that 31 were positive to one or more tests, although the dogs showed no signs or lesions of brucellosis. The intradermopalpebral test gave reliable results (an increase in skin thickness of 3 mm.). The organism was isolated from 12 of 16 dogs which reacted; in several, from the tonsils and salivary glands. Infection in two men was traced to a dog used in an infected flock. Dogs reacting to such tests should be killed.—*Vet. Bull. (Sept., 1958): Item 2759.*

Polycythemia Rubra Vera in the Dog

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POLYCYTHEMIA VERA (erythremia) has been defined[3] as a disease of insidious onset, chronic course, and of unknown cause, which is characterized by a striking absolute increase in the number of erythrocytes and in the total blood volume, and frequently by signs of increased bone marrow activity. Clinically, there is a reddish purple color of the skin, a variety of vasomotor and neurological manifestations, and usually splenic enlargement.

A review of the literature fails to disclose any authenticated reports of this condition in domestic animals.

CASE REPORT

On Jan. 27, 1958, a male English Cocker Spaniel, 5 years old, was presented at the veterinary clinic at Ohio State University. For several months the dog had shown epistaxis, lethargy, polydipsia, polyphagia, and muscular tremors of the lower jaws. Since having distemper in 1952, the dog had lost his senses of smell and sight. He had been treated for tapeworms one week previously. The dog appeared underweight and chronically ill, but was in no acute distress.

His temperature was normal. There was a thick, sanguineous, bilateral discharge from the nostrils, and the oral and nasal mucosa had a dark reddish purple cast. Respirations were normal in rate but labored, and moist rales could be detected. There was no pupillary reflex; the dog was unable to follow a light and bumped into objects. There were no discernible lesions of the ocular fundus. Despite a bradycardia, no abnormal heart sounds could be auscultated. During hospitalization, there was no appreciable change in the dog's physical condition. He exhibited intermittent anorexia and marked lethargy.

Laboratory Findings.—On admission, the blood showed a hemoglobin reading of 28.3 Gm., a hematocrit reading of 65 per cent, and a leukocyte count of 15,700 per cubic millimeter (segmented neutrophils 77%, nonsegmented neutrophils 6%, lymphocytes 16%). The urinalysis showed a 4+ albumin, one hyaline cast per high power field, and numerous leukocytes and epithelial cells per high power field. Blood urea nitrogen was 15.8 mg. per 100 ml. Fecal flotation was negative.

Three days after admission, the erythrocyte count was 12,000,000/cmm; the individual cells showed no abnormalities and the corpuscular constants fell within the normal range.

Bacteriologically, a pure culture of *Aerobacter aerogenes* was recovered from the urine. The nasal exudate was sterile.

Cardiac catheterization revealed no intracardiac shunts or pulmonic stenosis. Repeated radiographic examination of the skull, nasal cavities, and lungs failed to reveal any significant abnormalities.

A blood volume study made two weeks after admission, using Evans[1] blue dye, showed a plasma volume of 670 ml. and a cell volume of 1,300 ml., giving a total blood volume of 1,970 ml.; the normal blood volume for a dog of this weight (16.5 kg.) is 1,320 to 1,650 ml. A diagnosis of polycythemia vera was made.

Treatment consisted of venesection on alternate days, withdrawing 250 ml. of blood, and replacing it with an equal volume of sterile saline solution. Although the animal appeared brighter for a short time after each treatment, there was no permanent improvement and euthanasia was performed.

Necropsy Findings.—Significant findings at necropsy were: hyperemia of the nasal turbinates with some mucopurulent exudate, and a mural endocarditis of the right atrium which might be explained by the trauma of catheterization.

The bone marrow was dark red and gelatinous. Microscopically, much of it was highly cellular (grade four), the myeloid-erythroid ratio was 1.1:1 (normal-2.5-4:1), the predominant cell type was the metaru-

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The authors acknowledge the assistance of Dr. C. R. Smith and members of the Department of Physiology, who performed the cardiac catheterization.

bricyte and, in addition to a marked hyperplasia of the erythroid series, the myeloid series was also somewhat hyperplastic.

DISCUSSION

Some authors[2] are of the opinion that polycythemia vera does not occur in animals. However, the clinical and pathological findings in this patient appear to justify the diagnosis, making it the first authenticated case in veterinary literature.

The dog showed several signs commonly associated with polycythemia vera in man, *i.e.* epistaxis, lethargy, and discoloration of the skin and mucous membranes. The nervous signs seen in this animal were believed to be the result of the dog's previous case of distemper. The finding of albuminuria and casts, unassociated with a specific nephritis, has also been described in polycythemia vera. The common causes of erythrocytosis (heart disease, anoxia, and dehydration) were not present.

SUMMARY

A case of polycythemia vera in a dog is described. The clinical signs were lethargy, epistaxis, reddish purple discoloration of the visible mucosa, and dyspnea.

The laboratory findings were a marked increase in the total blood volume and an absolute increase in the number of red blood cells. The bone marrow showed definite hyperplasia, especially of the erythroid elements.

References

[1]Kohmer, J. A., Spaulding, E. H., and Robinson, H. W.: Approved Laboratory Technique. 5th ed. Appleton-Century-Crofts, Inc., New York (1951): 66-69.

[2]Reihart, O. F.: Blood and Blood Forming Organs. In "Canine Medicine," edited by H. P. Hoskins. American Veterinary Publications, Inc., Evanston, Ill. (1953): 199.

[3]Wintrobe, M. W.: Clinical Hematology. 4th ed. Lea & Febiger, Philadelphia, 1956.

Research on Cyanacethydrazide

Left in an untreated flock, 4 sheep were given, orally, a 25 per cent solution of cyanacethydrazide in distilled water (17.5 mg./kg. body wt.) daily for three days. That their parasitism was not perceptibly influenced was indicated by the number of larvae obtained daily by tracheal probing, although there was some clinical benefit.

In a second test, larvae from the tracheal tract of the sheep were treated *in vitro* in aqueous solution of 1.3 to 4.0 Gm. of the drug per liter. The larvae were surrounded by mucus and the various solutions of the drug were less toxic to them than was physiological saline solution.

In a third test with 5 sheep infected with pulmonary parasites, 2 were given the 25 per cent aqueous solution orally plus 15 mg./kg. subcutaneously for three days. Tracheal specimens taken for eight days before and three weeks after the treatment showed no significant changes in the vitality and number of the larvae recovered from the treated and the control sheep. When the subcutaneous dose was doubled, the larvae were not affected but the sheep showed depression and temporary anorexia. It was concluded that the benefits reported by others must be explained by indirect actions of the drug.—*J. Guilhon and J. P. Petit in Bull. Acad. Vét. France (July, Aug., Sept., 1958):355.*

Nocardiosis in a Dog

A male sheep dog, 2 years old, with hairless patches over the body (especially the abdominal region), pruritus of six months' duration, and a poor appetite was brought to the clinic Nov 20, 1957. It showed a tenderness over the abdominal region and a temperature of 104.6 F.

After death, two days later, necropsy showed emaciation and enlarged superficial lymph nodes, especially the parotid and prescapular nodes. No mange mites were found on the denuded areas. In the lungs, there were fibrin-covered, dark grayish consolidated areas of 2 cm., or more, in depth which, when cut, exuded sanguinopurulent fluid.

A fluctuating swelling, 5 cm. in diameter, at the bifurcation of the trachea was found to include enlarged, indurated, suppurating bronchial lymph nodes. The exudate was whitish yellow, fairly thick, and odorless.

There were many tiny yellowish white abscesses in the cortices of both kidneys. The exudate contained numerous gram-positive, filamentous organisms, but no sulfur granules typical of *Actinomyces bovis.*

The organism was identified as *Nocardia asteroides.* It was highly sensitive to chlortetracycline and oxytetracycline but not to four other antibiotics.—*Indian Vet. J. (July, 1958): 280.*

Screening Tests of Some Organic Phosphorus, Carbamate, and Other Compounds Against *Strongyloides Stercoralis* in the Dog

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No SATISFACTORY anthelmintic is known for use against the nematode, *Strongyloides stercoralis*, in the dog and cat. The fortuitous acquisition of Beagle pups infected with this parasite made it possible to screen a number of organic phosphorus, carbamate, and other compounds for activity against it. Although the results obtained were no more than suggestive, it may be some time before additional infected dogs can be obtained; therefore, results are recorded for guidance in future studies.

MATERIALS AND METHODS

The pups used in this study were all naturally infected with *S. stercoralis*. Diagnosis and presence of infection were established by identification of the larvae in direct fecal examinations and also by identification of the adult worms at necropsy. The pups were 2 to 4 months old and weighed 3.6 to 11.9 kg. at the time of treatment. The drugs were given in gelatin capsules by mouth.

Since this was a screening test and relatively few animals were available, a single dog was used for each compound and additional dogs were given lower doses only if the initial dose proved toxic. The pups were weighed before treatment and weekly thereafter. Periodic fecal examinations were made after treatment.

Two untreated, infected control dogs were observed along with each group of treated dogs. Dogs which remained positive for *S. stercoralis* larvae following treatment with one compound were treated with another one after an interval of at least a week.

RESULTS AND DISCUSSION

Strongyloides infection disappeared from a dog given, by mouth, 100 mg. per kilogram of body weight of 0-2, 4-dichlorophenyl -0, 0-di-ethyl phosphorothionate,† and the compound had no apparent effect on the dog.

The Strongyloides infections disappeared from dogs given, by mouth, 100 mg./kg. of body weight of the following compounds, but they also disappeared from 1 of 2 untreated control dogs: phosphoric acid, 0-2,4,5-trichlorophenyl, diethyl ester;† phosphorotrithious acid, tripropyl;† *bis*-(dimethylthiocarbamyl) sulfide;** 1 benzcarbamyl-1,1-diphenyl-3-piperidino propane hydrochloride.‡ The compounds had no apparent effect except that the dog given the last compound lost 0.25 lb. one week after treatment.

The following compounds were ineffective against Strongyloides and had no apparent effect on the dogs when given, by mouth, at a dosage of 100 mg./kg. of body weight: phosphoric acid, 2-chlorovinyl, dimethyl ester;* phosphoric acid, 2,2-dichlorovinyl, diethyl ester;* phosphoric acid, 2,2-dichlorovinyl, dipropyl ester;* phosphoric acid, triethyl ester;** phosphoric acid, 2,2-dichloro-1-hydroxyethyl, *bis*-(p-chlorobenzyl) ester;* diamidophosphoryl chloride, N,N'-diphenyl;** phosphorus acid, *bis*-(2-ethylhexyl) ester, zinc salt;** phosphorus acid, 0,0,0-*tris*-(2-ethylhexyl) ester, complex with 1 f. wt. mercuric chloride;** 1-benzcarbamyl-1-phenyl-3-piperi-

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This work was partially supported by research contract No. DA-49-007-MD72800, Office of the Surgeon General, U.S. Army. The views and conclusions are those of the authors and are not to be construed as necessarily reflecting the views or endorsement of the Department of Defense.

The authors thank Drs. Julius P. Kreier, William W. Lovett, and Gale D. Taylor for assistance in carrying out these studies.

Compounds were supplied by: *Entomology Research Branch, Agricultural Research Service, U.S.D.A.; **Chemical-Biological Coordination Center, National Research Council, Washington, D.C.; †Virginia-Carolina Chemical Corp., Richmond, Va.; ‡Eli Lilly and Co., Indianapolis, Ind.; §Columbia Southern Chemical Corp., Barberton, Ohio.

dino-1-propanol hydrochloride;‡ dicyclopentenyl ether;§ 10-phenothiazine carboxylic acid, ethyl ester, 5,5-dioxide;** 1-penten-3-one-1-(*p*-methoxyphenyl)-5-piperidino-, hydrochloride.**

The following compounds were ineffective against Strongyloides when given by mouth at a dosage of 100 mg./kg. of body weight, but had the indicated effects on the dogs: phosphoric acid, 2,2-dichlorovinyl, dimethyl ester*—caused excessive salivation 3.5 hours after treatment, but no other apparent effects; carbamic acid, benzyl-, isopropyl ester**—dog lost 1.5 lb. within a week after treatment; dibutylamine, l-ethynyl**—dog vomited soon after treatment.

One dog, treated by mouth with 75 mg./kg. of body weight of S-*p*-chlorophenyl-0,0-diethyl phosphorothiolate,† was in a state of collapse 1.5 hours later and died during the night. At necropsy, the perianal region and tail were coated with blood which apparently came from the digestive tract, and the lungs were light bluish gray, with areas of diffuse congestion. The trachea contained a small amount of bloody, frothy fluid which increased in amount toward its bifurcation.

The heart was normal in size and shape, uniformly purplish, with slightly thickened valves and a triangular focus of hemorrhage in the wall of the interventricular septum. The spleen was deep purplish blue. The liver was light purple with areas of gray discoloration which may have been due to postmortem decomposition. The kidneys were slightly congested. The serosal surface of the whole intestine was hemorrhagic. The intestinal wall was thickened. The duodenum and ileum contained a bloody fluid, and the rectum contained free blood. A few dead Strongyloides organisms were found in the mucosa of the duodenum and ileum. No other gross abnormalities were seen.

Two dogs treated with 10 and 20 mg./kg. of body weight, respectively, of the same drug remained apparently normal and their Strongyloides infections were not affected.

While sound conclusions cannot be drawn from the results obtained in treating a single dog, further study of 0-2,4-dichlorophenyl-0,0-diethyl phosphorothionate would appear to be justified. This compound is now being manufactured commercially for use against plant nematodes.

SUMMARY

In screening tests for nematocidal activity against *Strongyloides stercoralis* in the dog, 0-2,4-dichlorophenyl-0,0-diethyl phosphorothionate appeared to eliminate the nematodes from 1 dog, while two other organic phosphorous compounds and two of four carbamates gave questionable results. Fourteen other compounds were ineffective.

An oral dose of 75 mg. per kilogram of body weight of S-*p*-chlorophenyl-0,0-diethyl phosphorothiolate caused death with marked intestinal hemorrhage in 1 dog, but doses of 10 and 20 mg./kg. given to 2 other dogs had no apparent effect. This compound was ineffective against *S. stercoralis*.

Vibrio Suis and Swine Dysentery

Vibrio suis (*V. coli*) was recovered from the intestinal tracts of pigs with swine dysentery on four farms in Poland. On one farm, 79 of 357 pigs died in 23 days. The pigs had recently been vaccinated for hog cholera and swine erysipelas, but these infections could not be demonstrated by bacteriological and transmission experiments. When 6 pigs were fed the Vibrio cultures for three days, 1 developed dysentery after eight days, 3 developed a transient diarrhea, and 2 remained healthy. One of 2 contact pigs developed dysentery.

The Vibrio was found in 12 of 20 normal slaughtered pigs. It was regarded as a facultative pathogen which could cause disease when the animal's resistance was lowered by stress factors.—*Vet. Bull. (Aug., 1958): Item 2439.*

Polyarthritis in the Cat

Arthritis and arthrosis are common diseases of dogs. Acute peripheric pseudorheumatic polyarthritis and chronic polyarthritis are infrequent diseases of cats and have received little study. There is confusion with respect to the causes. Several clinical cases are described in which articular affections are manifested in sheathed ankylosed panarthritis or in the rhizomelic spondylosis similar to that encountered in man. In the most advanced cases, ankylosis has begun and treatment brings no improvement.

The cause, possibly an infection or allergy, is undetermined.—*Bull. Acad. vet. France (July, Aug., Sept., 1958): 320-321.*

Osteosarcoma of the Tibia and Fibula of a Dog

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Caracas, Venezuela

A male Boxer, 9 months old, was lame in the left hindlimb. The dog had recently been struck by a car and this was thought to be the cause of the lameness. No swelling or crepitation was present, and no radiograph was taken. However, when examined 40 days later, the lameness had increased and there was a large swelling at the femorotibial joint. A lateral radiograph was taken (fig. 1).

The lesion was diagnosed as an osteosarcoma and the dog was euthanatized. The tumor, when excised, weighed 500 Gm.

[It is not uncommon for lesions like this to be unnoticed until after an injury. There is little evidence to prove that injury predisposes to neoplasia. Instead, the neoplasm probably was present when the injury occurred.

Fig. 1—Radiograph, lateral view, of the stifle joint of the left hindlimb of a dog, showing an osteosarcoma of the tibia and fibula.

In man, osteosarcomas usually occur before middle age, starting near the epiphysis of a long bone. In this young dog, the radiograph indicates that the neoplasm started at or near the epiphysis of the proximal end of the tibia.—W.H.R.]

Dr. Rodrigo is a small animal practitioner in Caracas, Venezuela.

Splenic Infarcts and Hog Cholera

Marginal infarcts in the spleen were found in 30 to 60 per cent of field cases of hog cholera (swine fever); infarcts in the center of the spleen were less common. In 15 of 250 cases, marginal infarcts were the only lesions in the animal. The findings were similar in the spleens of 500 swine artificially infected with American hog cholera virus.

Histologically, the infarcts seemed to be caused by hyaloid lesions of the arteries and are considered pathognomonic of cholera.—*Med. Wetryn., 14, (1958)*: *459.*

Cobalt Pellets for Ruminants

A prolonged shortage of cobalt in the ration of ruminants results in a deficiency in the formation of vitamin B_{12} by rumen microorganisms. This seems to explain why cobalt is beneficial only if administered *per os*.

In Australia, a frequently fatal demyelinating disease known as phalaris staggers, common in sheep and cattle which are confined to pastures where the grass *Phalaris tuberosa* is dominant, is prevented if animals are given cobalt. Because of the difficulty in supplying cobalt by applying it on the pastures or by frequent drenching it was given as pellets, one to each sheep. These 5-Gm. pellets are ½ inch in diameter, contain 90 per cent of cobaltic oxide, have a specific gravity of 4:1, and are retained in the reticulum. Their effectiveness over a period of many months was equal to frequent drenching with the equivalent of 1 mg. of cobalt per day.

In the less than 2 per cent of the sheep in which signs of deficiency (pining) developed, it was found that either the pellets had become coated with calcium phosphate or they had not been retained.—*D. W. Dewey et al. in Nature (May 17, 1958): 1367.*

In a nine-month experiment, in Britain, starting in November, 1957, 30 young ewes were allotted to three groups of 10 each. Those of group 1 were given a single cobalt pellet (90% cobaltic oxide) at the beginning of the experiment; those in group 2 were given 70 mg. of cobalt in an aqueous solution at two-week intervals; and those in group 3 were given no cobalt.

After five months, those given the pellets had made a significantly greater gain in weight than those drenched biweekly. After eight months, 4 of the 10 untreated ewes were showing signs of pining but recovered rapidly following cobalt therapy.—*L. B. O'Moore and P. J. Smyth in Vet. Rec. (Sept. 20, 1958): 774.*

Parturient Paresis and Vitamin D.—In a test with 30 herds of Jersey cows, in Ohio, when vitamin D was fed for five days before parturition at the rate of 15 million units per day, the cases of parturient paresis were reduced by 53 per cent; at 20 million units per day, by 79 per cent; and at 30 million units per day, by 81 per cent. To aid in estimating the calving date, it should be recalled that the gestation period averages 288 days for Brown Swiss cows, 283 for Guernseys, 278 for Holstein-Friesians, and 278 days for Jerseys and Ayrshires. For old cows, the period is about one day longer.—*Farm J. (Nov., 1958):58.*

A record price of $85,000 was paid by an Iowa raiser for a Shetland pony stallion from Valleyview, Texas.—*Farm J. (Sept., 1958):16.*

Teratogenic Effects of Vitamins

Among the common malformations induced by maternal hypervitaminosis A are cleft palate and deformities of the brain and skull, such as hydrocephaly. Maternal deficiencies in vitamins of the B complex have produced similar fetal anomalies.

When eight to 13 days pregnant, two groups of rats were given 40,000 units of vitamin A acetate by stomach tube, and one of these groups was also given 0.5 ml. of vitamin B complex by subcutaneous injections. On day 20, the rats were killed and their fetuses were examined. Of the 121 fetuses from the females not given vitamin B, 9 (7.4%) showed deformities of the brain and 38 (31.4%) had cleft palates, whereas none of the vitamin B group showed brain deformities and only 2 (1.5%) had cleft palates.

This indicates that a relative balance between the different vitamins is critical for normal development and that an excess of vitamin A may produce a vitamin B deficiency.—*Nature (Oct. 4, 1958): 940.*

The Hemogram in Pig Anemia

An anemia with the same hematology, histology, and serum protein changes as found in natural cases was induced in young pigs. This anemia was prevented by feeding the sows a mixture of meat meal (100 Gm./day), vitamin B_{12}, folic acid (10 mg.), and iron (22 mg. Fe gluconate) for 50 days before and 50 days after parturition.

Protein deficiency, while not the only factor, plays an important role in this anemia; iron deficiency plays only a subsidiary role.—*H. Köhler in Zentralbl. f. Vet.-med. (July, 1957): 459.*

Editorial

Veterinary Ownership of Biological and Pharmaceutical Supply Firms

The possible contravention of public policy through group veterinary ownership of biological and pharmaceutical supply firms was suggested in the 1958 report of the AVMA Committee on Veterinary Service (*see* JOURNAL, Part 2, Dec. 1, 1958: 51-54).

The AVMA House of Delegates concurred in the recognition of these dangers by its action in accepting the report.

More recently, the Council on Veterinary Service, during its meeting in Chicago, Nov. 18-19, 1958, endorsed and supported the action taken at Philadelphia and urged that steps be taken to acquaint all AVMA members with this problem.

In addition to the effect that group ownership may have on the relations between the client and his veterinarian, it is possible that the present concept of professional relationships among veterinarians can be irreparably damaged by this trend.

We have recently heard the expression "unfair trade practices" used in connection with intraprofessional relationships.

Some have inferred that the violation of veterinary ethics and unfair trade practices are one and the same. With this philosophy, we do not agree.

The practice of veterinary medicine is a professional pursuit and not a trade. When merchandising, production, sales advantage, and economic gain occupy a primary position in the veterinarian's endeavor, he is not engaged in the practice of his profession but is, instead, a tradesman entitled to the advantages of certain trade practices but not entitled to the prestige and recognition afforded the members of our profession.

The danger that veterinary ownership of biological and pharmaceutical supply firms will cause the public and veterinarians alike to think of veterinary medicine not as a profession but as a trade is an additional reason for AVMA members to take cognizance of this development.

Production of Rabies, Distemper and Hepatitis Vaccines

A recent publication by the U.S.D.A. contains some interesting data indirectly related to the various methods of vaccinating dogs against canine distemper and infectious canine hepatitis, a favorite topic of conversation when veterinarians meet. One practitioner prefers to use a series of injections of "killed tissue vaccine," his colleague in the next town gives only one injection of chicken embryo (LVM, CEO) vaccine, and still another uses combinations of both. Some include in their program vaccination against infectious canine hepatitis; others do not.

A related subject, less complicated because only two types of vaccine are available, is rabies vaccination. The practitioner who has preferred to use phenolized rabies vaccine may wonder if he is in the minority, while his colleague who several years ago changed to the exclusive use of LVM, CEO rabies vaccine wonders how many others have done so.

Biological Products Notice No. 56 (U.S.D.A., ARS, Animal Inspection and Quarantine Division, Sept. 8, 1958) provides some information relative to the production of these vaccines which should interest all veterinarians who use them. Pertinent figures from the notice are:

Type of Vaccine	Doses Produced in Licensed Establishments During Fiscal Year Ended June 30, 1958
Rabies vaccine (both caprine and ovine origin)	2,939,168
Rabies vaccine (LVM, CEO)	4,094,966
Canine distemper vaccine, tissue origin	15,346
Canine distemper vaccine, LVM, CEO	1,023,859*
Canine distemper vaccine in Bronchi-septicus-Streptococcus-Typhimurium bacterin	173,624*
Infectious canine hepatitis vaccine	408,566*
Canine distemper vaccine and infectious canine hepatitis vaccine in Bronchi-septicus-Streptococcus-Typhimurium bacterin	1,308,395*
Canine distemper vaccine and infectious canine hepatitis vaccine, canine origin	235,751*
Canine distemper vaccine and infectious canine hepatitis vaccine, LVM, CEO	173,219*

*These figures do not represent the number of doses used, for it is impossible to report those which were unsold or destroyed for various reasons at the establishments.

ABSTRACTS

Survival of Eimeria Stiedae Oocysts

Unsporulated oocysts of *Eimeria stiedae*, collected from liver lesions and gallbladders of experimentally infected rabbits, were stored at 5 C. for 3.5 to 4.5 years. When placed in 2 per cent potassium dichromate solution, these oocysts sporulated normally and produced typical liver lesions in test rabbits. Sporulated and unsporulated oocysts, suspended in 5 per cent glycerol, in 1 per cent gelatin, and in 1 per cent milk solutions, were quick frozen and held at −25 C. for one to 30 days. When thawed and placed in dichromate solution, the unsporulated oocysts failed to sporulate. The sporulated oocysts were still viable after 30 days at −25 C. and produced typical liver lesions in test rabbits.—[*Karl W. Hagen, Jr.: The Effects of Age and Temperature on the Survival of Oocysts of Eimeria Stiedae. Am. J. Vet. Res., 19, (Oct., 1958): 1013-1014.*]

Effect of Adrenaline on Uterine Motility

Eighty-six bitches, 5 months to 4 years old, were used at different stages of their sexual cycles, or they were ovariectomized and treated with different hormones. The effect of adrenaline on the uterine motility was demonstrated *in vitro* and *in vivo*.

Adrenaline, *in vitro*, relaxed uterine tissue from bitches which were immature, ovariectomized, and ovariectomized and treated with estrogen followed by testosterone. However, adrenaline stimulated the motility of uterine tissue from immature bitches treated with estradiol or testosterone and from estrous, nonestrous, and pregnant bitches treated with estradiol alone or followed by desoxycorticosterone.

In vivo, adrenaline stimulated the uteri of pregnant and estrous bitches, but inhibited the organ during nonestrous stages.—[*A Sharaf and A. Dabash: Effect of Adrenaline and Sex Hormones on the Uterine Motility of the Bitch. Am. J. Vet. Res., 19, (Oct., 1958): 935-939.*]

Complement-Fixation Test for Sarcosporidiosis

This paper presented results with which to evaluate the complement-fixation test in the diagnosis of sarcosporidiosis.

A frozen and thawed extract of Sarcocystis yielded the most potent complement-fixing antigen. The antigen proved highly specific and detected infection in other animals, including man. Of 245 sheep tested, 172 were positive to the complement-fixation test—58 in the absence of detectable infection. There were no reactions in 21 animals with detectable cysts. It was found that the failure of microscopic examination to detect infection is about three times that of the complement-fixation test.

It was concluded that the complement-fixation test is a reliable, practical method for diagnosing sarcosporidiosis, and also could be used to differentiate this infection from toxoplasmosis.—[*F. I. Awad: The Complement-Fixation Test in the Diagnosis of Sarcosporidiosis. Am. J. Vet. Res., 19, (Oct., 1958): 1010-1012.*]

Cholinesterase Activity of Bovine Blood

The erythrocyte cholinesterase activity of 27 Aberdeen Angus cattle and 30 unselected cattle from a slaughterhouse was determined, using the colorimetric method of Fleisher and Pope. The accuracy of this method does not depend, with reference to the blood sample, on the absence of clots and hemolysis, on refrigeration, or on the type of anticoagulant used.

The average erythrocyte cholinesterase activity of the group of Aberdeen Angus cattle was 1.62 μM (1.10-2.25) of acetylcholine, used with a standard deviation of 0.27; that of the unselected slaughterhouse cattle was 1.26 μM (0.50-2.14) of acetylcholine, used with a standard deviation of 0.34.—[*Charles S. Petty and Marjorie P. Lovell: Cholinesterase Activity of Bovine Blood. Am. J. Vet. Res., 19, (Oct., 1958): 836-839.*]

Adrenal Cortical Adenomata

A total of 1,287 adrenal glands from 831 goats were examined for the presence of cortical adenomata. Tumors were found in 169 (21.9%) of 770 adrenal glands from castrated males, while no tumors were found in 244 adrenal glands from normal male goats; only two of 273 glands from females contained adenomata. All tumors were less than 11 mm. in diameter and most were observed only by microscopic examination. The adenomatous cells were polygonal to fusiform, but an apparent development from normal cortical cells could be traced. No metastases were observed.—[*Ward R. Richter: Adrenal Cortical Adenomata in the Goat. Am. J. Vet. Res., 19, (Oct., 1958): 895-901.*]

Test for Bovine Adrenal Gland Function

The response of circulating eosinophils to varying doses (150, 250, 300, 310, 400, 600 units) of adrenocorticotrophic hormone (ACTH) was measured in 24 trials in 11 dairy cows. The response was measured hourly from the first to nineteenth hours, inclusive. It was determined that a 400-unit dose would produce a maximum decrease in circulating eosinophils (greater than 65% in all trials) in cows of varying body weights. This maximum decrease occurred about ten hours postinjection. The results reported are suggested as a preliminary step in the development of a clinical test for diagnosing adrenal cortical insufficiency in cows.—[*R. T. Hopwood and B. J. Tibolla: The Effect of Adrenocorticotrophic Hormone on the Circulating Eosinophil Level—A Possible Screen-*

ing Test for Adrenal Gland Function in the Cow. Am. J. Vet. Res., 19, (Oct., 1958): 833-835.]

Uptake of Radioiodine in Sheep

Supplying iodized salt in customary prophylactic amounts to sheep on a ration low in stable iodine reduced thyroid gland uptake of a tracer dose of I^{131} by over 30 per cent. Daily administration of 2.5 mg. of inorganic iodine (KI) to sheep maintained on 5.0 and 0.15 μc. of I^{131} daily reduced thyroid uptake to less than 50 per cent of that of the controls.—[*L. K. Bustad, D. E. Warner, and H. A. Kornberg: Effect of Stable Iodine on Uptake of Radioiodine in Sheep. Am. J. Vet. Res., 19, (Oct., 1958): 893-894.*]

Tumors of the Bovine Acoustic Nerve

Two tumors of the acoustic nerve in cattle, both of which showed many of the features of the acoustic nerve tumor in man, were described. These neoplasms were situated within the cranium on the root of the eighth nerve and were composed of the two types of tissue commonly found in the lesions in man. The essential neoplastic cell was an elongated syncytial cell which was arranged in interlacing bands.

One tumor was composed primarily of loose, reticular tissue, whereas the second was a more solid structure. The latter contained many individual, apolar structures that appeared to be fibers of the acoustic nerve that had been engulfed by the neoplasm. These tumors were classified as schwannomas.—[*D. J. Sullivan and W. A. Anderson: Tumor of the Bovine Acoustic Nerve—A Report of Two Cases. Am. J. Vet. Res., 19, (Oct., 1958): 848-852.*]

Mercury in Animal Tissues

A method was described which yielded, within the range of 0 to 50 μg., a 98 per cent average recovery of mercury from tissues. Tissue digestion was carried out in a combined condenser-cold finger apparatus. After separation of interfering ions, the mercury was estimated by dithizone titration.—[*W. T. Oliver and H. S. Funnell: The Quantitative Determination of Mercury in Animal Tissues. Am. J. Vet. Res., 19, (Oct., 1958): 999-1000.*]

Steroid Hormones and Canine Uterine Growth

Eighty-six mature and 58 immature bitches, 4 to 5 months old, were used to demonstrate the potency of some steroid hormones and related compounds on canine uterine growth. All the steroid sex hormones, estradiol, testosterone, and progesterone, and the synthetic estrogen, stilbestrol, stimulated uterine development in immature bitches. Stilbestrol was most potent, especially when followed by progesterone; testosterone was second, and estradiol third.

The administration of estradiol alone to ovariectomized bitches increased the uterine development. Bitches given estrogen followed by testosterone, progesterone, ethisterone, desoxycorticosterone, or pregnenolone developed uteri much larger and heavier than those of the ovariectomized control animals.—[*A. Sharaf and A. Dabash: Relative Potency of Some Steroid Hormones and Related Compounds on Canine Uterine Growth. Am. J. Vet. Res., 19, (Oct., 1958): 931-934.*]

BOOKS AND REPORTS

The Interference Microscope

The interference or light microscope plays an important role in the elucidation of cellular metabolism. It enables investigators to map out the structure of cells and tissues and to relate this structure to the activities of the organism.

This 114-page book outlines the technique of interference microscopy, discusses the use of the instruments that are commercially available, and describes the errors and limitations of the method. An introductory paragraph deals with the physical basis of interferometry; the second chapter, with types of equipment available; and the remaining five chapters, with techniques of interpretation, measurement, and possible sources of error.

Of little interest to most veterinarians, this book will nevertheless have much value for investigators working in the field of cytology and cell metabolism.—[*The Interference Microscope. By Arthur J. Hale. 114 pages; illustrated. Williams and Wilkins Co., Baltimore, Md., 1958. Price $5.00.*]—D. A. PRICE.

Advances in Veterinary Science

The fourth in a series of multiple author compilations is presented less than a year after the appearance of the preceding volume. The purpose of the series is to survey and bring up to date reports of the most active research fields of veterinary medical science. A glance at the contents of this publication reveals its timeliness.

The volume is made up of ten sections: defense against imported infectious diseases; radiation injury; x-ray therapy in veterinary medicine; genetics and disease; infectious diseases of sheep; infectious rhinitis of swine; enzootic virus pneumonia and Glasser's disease of swine; the toxicity of insecticides and herbicides to livestock; epizootiology of leptospirosis; and Johne's disease.

The wisdom displayed by the editors in their choice of authors can not be questioned. The reader unacquainted with the accomplishments of the author of any section will have his confidence in the ability of the man bolstered by examining the extensive bibliography at the end of the section. All the contributors are recognized as outstanding investigators. They represent six nations. This lends

an international aspect to the volume that is both stimulating and revealing.

The editors have again succeeded in overcoming the difficulties that attend the production of multiple author volumes. The result is a pleasing presentation of a wealth of factual material that will prove beneficial to any progressive veterinarian regardless of his chosen field.—[*Advances in Veterinary Science. C. A. Brandly and E. L. Jungherr, editors. Vol. 4. 414 pages; illustrated. Academic Press, Inc. New York, N.Y. Price not given.*]—C. H. COVAULT.

Textbook of Veterinary Food Control

The third revision of this book was in the process of printing in 1943-1945 but type and plates were destroyed in the war. Immediately thereafter, the authors—leading authorities in veterinary food control—started preparation of this third enlarged revision. To permit more thorough and extensive treatment of material presently included in text, milk and dairy products have been eliminated from this revision. All other foods derived from food-producing animals are included in this book. Meat and meat food products (fresh, chilled, frozen, canned, cured), wild animals, poultry, eggs, fish, and crustaceans are discussed in detail.

Special emphasis has been placed on the bibliography at the end of each subchapter and chapter. These are extensive and include all pertinent references on subject material.

This comprehensive, well-written, fully illustrated and authoritative text, amply supported by carefully selected numerous references, merits the attention of all veterinarians engaged in teaching, research, administration, and operation of modern veterinary food hygiene and control.—[*Textbook of Veterinary Food Control (Lehrbuch der Tieraerztlichen Lebensmittelueberwachung). By M. Lerche, H. Rievel, and V. Goerttler. 3rd enlarged ed. 1078 pages; 670 illustrations, 15 colored photographs. Published by Verlag M & H Schaper, Hannover, Germany, 1957. Price approx. $33.00.*] —WM. E. JENNINGS.

Comparative Morphology of Carotid Body and Sinus

This book is a detailed discussion of the comparative anatomy, histology, and embryology of the carotid body and carotid sinus of numerous species throughout the vertebrate series. Many authors of "comparative" monographs emphasize the mammal and devote little space to other vertebrates, but Dr. Adams has written a truly comparative treatise.

The author wisely restricts himself to the area in which he himself has worked, admittedly neglecting the "rete mirable caroticum" and the aortic bodies. The carotid body and carotid sinus of numerous species of mammals, birds, reptiles, amphibians, and fish are discussed and illustrated in detail, including macroscopic and microscopic anatomy, embryology, and function.

Of particular interest to the veterinarian are the descriptions of the carotid body in the dog, cat, horse, cow, sheep, and goat. Special reference is made to the arterial pattern at the carotid bifurcation, both in relation to the carotid body and carotid sinus and, to a lesser extent, the cerebral circulation. Although a comprehensive bibliography is included, this book is not a mere compilation of the literature. It is first and foremost the result of original investigations by the author.

The reviewer feels that this volume would be a valuable addition to the libraries of veterinary anatomists, physiologists, and pathologists as well as to biologists. Until now, information concerning this important area could only be obtained by reading widespread sources in the literature. The publishers deserve credit for the excellent quality of reproductions, the paper, and the format.—[*The Comparative Morphology of the Carotid Body and Carotid Sinus. By William E. Adams. 272 pages; illustrated. Charles C Thomas, 301-327 E. Lawrence Ave., Springfield, Ill. Price not given.*]—GEORGE C. CHRISTENSEN.

Reproductive Physiology

This book contains basic information about the physiology of reproduction in domestic animals, including chickens, laboratory animals, and primates, but the endocrine glands and problems of fertility and sterility are discussed in detail. The over-all subject of reproductive physiology is dealt with on a comparative basis. The 12 chapters contain adequate references, for the most part to texts and review articles.

This book will be welcomed by teachers of veterinary physiology, special students of the subject, and practitioners who have a special interest in breeding problems and wish to extend their reading beyond the limit of contemporary veterinary texts.—[*Reproductive Physiology. Comparative Reproductive Physiology of Domestic Animals, Laboratory Animals and Man. By A. V. Nalbandov. 271 pages; illustrated. W. H. Freeman and Co., San Francisco. 1958. Price $6.75.*]

Progress in Psittacosis Research and Control

This is the proceedings of the Second Symposium on Psittacosis held in New York City, Feb. 16-17, 1956. The symposium was held under the auspices of the New Jersey Agricultural Experiment Station, and was underwritten by the Hartz Mountain Products Corp. of New York. There were 21 contributors, and the volume was edited by the late F. R. Beaudette. This book adds much valuable material to the literature on ornithosis, and is a worthy successor to the first volume published three years ago, which was limited to a general discussion of the disease.

The second symposium dealt with ecological fac-

tors, diagnoses (lesions, isolation techniques, C-F antigens, intradermal tests, human infection), therapy (antibiotics for parakeets and turkeys), and progress in control.

With recognition of the public health hazard posed by ornithosis infection in food-producing birds has come a new interest in the control of the infection by the use of antibiotics, and three of the chapters deal with this problem.

This book should be in the possession of every worker in the field of virology because it contains much of the latest information on an important group of infectious agents. Binding and paper quality are exceptionally good.—[*Progress in Psittacosis Research and Control. Edited by F. R. Beaudette. 271 pages. Illustrated. Rutgers University Press, New Brunswick, N. J. 1958. Price not given.*]

Sheep Diseases

The first textbook on sheep diseases to be published in the United States now has its first revision. Originally written by the late I. E. Newsom in 1952, it has been revised by a person highly regarded as a research worker and as an authority on sheep diseases. The original author, we feel, would have been pleased to know that a man of Dr. Marsh's stature would carry on this most valuable contribution to the veterinary literature.

In addition to some rewriting and to making some changes in the order of presentation, Dr. Marsh has added some sections and has included recent advances.

This is the best book on sheep diseases available, and to all interested veterinarians we heartily recommend it.—[*Newsom's Sheep Diseases. 2nd ed. By H. Marsh. 406 pages; illustrated. Williams and Wilkins Co., Baltimore. 1958. Price $9.00.*]

Dairy Handbook and Dictionary

Here is a compact reference book on dairy husbandry and technology which might interest those veterinarians with intensive interests in dairying. There are informative articles on breeding, feeding, and housing of dairy cattle; production of milk; processing of milk, butter, cheese, and ice cream; nutritive value of dairy products; role of chemistry and bacteriology; and sanitation.

Many formulas and tables are indexed in a reference section. A dairy section contains thousands of definitions of terms and subjects.—[*Dairy Handbook and Dictionary. By J. H. Frandsen. 800 pages. Nittany Printing and Publishing Co., State College, Pa. 1958. Price $9.75.*]

Amino Acid Supplementation

Amino acid supplementation of diets is costly and insufficiently explored. It would probably benefit only a small number of persons (including some children, pregnant or lactating women, convalescents, or elderly persons) in industrialized countries. Animal feeds are being fortified with amino acid on a limited scale, such as methionine in poultry feed, but more research and price adjustment will be required before this will be practical.

This bulletin lists 83 references and would be of interest to veterinary nutritionists.—[*Borden's Review of Nutritional Research, 19, No. 2. The Borden Co., 350 Madison Ave., New York 17, N. Y. 1958. Price not given.*]

Modern Breeds of Livestock

This revised edition of a text first published in 1949 is an interesting and profound treatise on the origin, importation, history, development, characteristics, production records, and evaluation of the principle breeds of livestock found in the United States. It includes 16 breeds of cattle, eight of swine, 13 of sheep, two of goats, 15 of horses, and the American jack.

Except for occasional repetition and the persistent use of certain superfluous words, such as black *in color*, large *in size*, and *very*, this book is well written. Veterinarians should find it pleasant and profitable reading. The author is now president of South Dakota State College, Brookings.—[*Modern Breeds of Livestock. Revised ed. By Hilton M. Briggs. 754 pages. Macmillan Co., N.Y., 1958. Price $8.50.*]

Veterinary Protozoology

This book is intended to be a textbook for students in tropical medicine and a handbook for the field officer. It is well written and remarkably complete in its coverage. It should be of value as a reference book to a veterinary teacher or research worker in the United States, but it is doubtful whether the practicing veterinarian will find the book of much value. Emphasis is placed on tropical diseases, and the chapters dealing with trypanosomiasis and babesiosis are excellent.

The book is well arranged, the printing is pleasing, and the illustrations good. It should prove a valuable aid to the worker in tropical medicine.—[*Veterinary Protozoology. By U. F. Richardson and S. B. Kendall. 260 pages. 2nd ed. Macmillan Co., 60 5th Ave., New York 11, N. Y., 1957. Price $4.20.*]—R. F. TURK.

Taxonomy and Genetics of Oenothera

Although it deals with plant genetics, this book might be of interest to those veterinarians who are engaged in genetics research or teaching. It is well written and the quality of photographs is good. The major divisions of the book cover evolution, taxonomy of the subject, genus, genetics, and cytology.—[*Taxonomy and Genetics of Oenothera. By R. Ruggles Gates. 115 pages; illustrated. Uitgeverij Dr. W. Junk, The Hague, Netherlands. 1958. Price not given.*]

THE NEWS

CDC's Epidemiology Course Rescheduled for January 12-16

Originally scheduled for Feb. 2-6, 1959, the Communicable Disease Center, in Atlanta, Ga., announced November 24, that the course on epidemiology for veterinarians will now be offered January 12-16.

The objectives of this one-week refresher course include: the development of an understanding of epidemiology as a tool in disease prevention and control; knowledge of epidemiological methods; and the strengthening of interest in epidemiology in its classical form and in its modern applications.

Application forms may be obtained by writing, wiring, or telephoning the nearest Regional Medical Director, Chief, CDC Services, in the following cities: 42 Broadway, New York 4; 700 E. Jefferson St., Charlottesville, Va.; 50 Seventh St., N.E., Atlanta 23; 69 W. Washington St., Chicago 2; 911 Walnut St., Kansas City 6, Mo.; 1114 Commerce St., Dallas 2; 621-17th St., Denver, Colo.; Civic Center, San Francisco 2, Calif.

AMONG THE STATES AND PROVINCES

Alabama

Radiobiology Included in A.P.I. Curriculum.—For two years, the School of Veterinary Medicine at the Alabama Polytechnic Institute has offered a course in radiobiology to all the junior-year students.

Dr. J. E. Greene, dean, believes that a knowledge of radiation, its measurement, and safe-handling is essential to veterinarians who may be called upon to pass on the safety of foods in an atomic era.

In this course at A.P.I., the students are taught the physics of radiation, theory of instrumentation, effects of radiation on animal tissues, as well as the public health aspects of radiation safety.

District of Columbia

Dr. Sexauer Appointed Staff Veterinarian in Livestock Division.—Dr. Rolla C. Sexauer (WSC '45) has been appointed staff veterinarian with the Meat Grading Branch of the Livestock Division, Agricultural Marketing Service, U.S.D.A. He succeeds Dr. Robert J. Lee (KSC '39) who has been transferred to the Poultry Division.

Dr. Rolla C. Sexauer

Dr. Sexauer came to Washington, D.C., from Salem, Ore., where he was in charge of the Oregon State Meat Inspection program.

Indiana

Dr. Tucker Receives Golden Egg Award from the State Poultry Association.—A highlight of the annual banquet of the Indiana State Poultry Association held at Purdue University, in Lafayette, was the presentation of the Golden Egg Award to Dr. Frank C. Tucker (MCK '09), Claypool, on Oct. 21, 1958.

This award is made annually to one who has made outstanding contributions to the poultry industry of the state. Dr. Tucker is credited

Dr. F. C. Tucker (left) receives the Golden Egg award from Stanley Barker, Thorntown, past-president of the Indiana State Poultry Association.

with extensive work in the control of poultry diseases, being among the first to commercially bloodtest for pullorum disease. He has also encouraged practitioners in the field to better appreciate the opportunities in practice with poultry and assisted the Purdue Veterinary Department in training schools on poultry diseases.

In addition, the development of commercial egg production in Kosciusco County, in which Dr. Tucker lives, has depended to a large extent upon his recommendations and advise. Dr. Tucker has also been active for many years in local and state poultry organizations. One of Dr. Tucker's two sons is also a veterinarian, Carl C., Fort Dodge Laboratories, Cedar Rapids.

Iowa

Eastern Iowa Association.—More than 200 veterinarians of the Eastern Iowa V.M.A. met at the Hotel Roosevelt in Cedar Rapids, Oct. 16-17, 1958, for the association's forty-fifth annual meeting.

The two-day program included technical papers and discussions by veterinary and livestock authorities chiefly from the Middle West: Drs. W.C. Burch, University of Wisconsin; Frank E. Connor, Morris, Ill.; John Herrick, Ames; F.E. Brutsman; Traer; Grant B. Munger, Cedar Rapids; A. C. Todd, University of Wisconsin; and William P. Switzer, Iowa State College.

Drs. William S. O'Brien, Ryan, and Iva Dunn, Atkins, were elected to life-time honorary memberships in the association for outstanding long-time service in the veterinary profession.

The newly elected officers for 1959 are: Drs. S.G. Paul, Clarence, president; F.E. Brutsman, Traer, president-elect; C.B. Thayer, Iowa City, secretary; William M. Lynch, Cedar Rapids, treasurer; and E.A. Rolston, Clinton, trustee.

s/GRANT B. MUNGER, *Correspondent.*

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Women's Auxiliary.—The Women's Auxiliary to the Eastern Iowa V.M.A. met in conjunction with the forty-fifth annual convention of the Eastern Iowa association at the Roosevelt Hotel in Cedar Rapids, Oct. 16-17, 1958. More than 78 Auxiliary members registered.

Mrs. Frank Linn, Sheffield, president of the Women's Auxiliary to the Iowa V.M.A., was guest of honor. Mrs. Linn brought greetings from the state association and extended an invitation to the state convention to be held in Des Moines this January.

During the business meeting, the Auxiliary voted to make $10 contributions to both the AVMA Research Fund and to the AVMA Loan Fund. Mrs. A. J. McIntosh, La Porte City, delegate to the AVMA Convention, presented a report on the meeting held in Philadelphia last August.

Following is the Auxiliary's newly elected roster for the coming year: Mrs. A. J. McIntosh, La Porte City, president; Mrs. Leroy Bell, Davenport, president-elect; Mrs. K. H. Randolph, Lost Nation, vice-president; Mrs. Floyd Beaver, Grinnell, secretary; and Mrs. Russell Anthony, Cedar Rapids, treasurer.

Mrs. Robert Van Dyke, Pella, was named delegate and Mrs. Leroy Bell, alternate delegate, to the 1959 national convention to be held in Kansas City, Mo., next August.

s/MRS. PEARL PFAFF, *Publicity Chairman.*

Louisiana

State Association.—Officers and delegates elected by the Louisiana V.M.A. for 1959 are as follows: Drs. James N. Thomas, Welsh, president; Otto C. Granzin, Baton Rouge, vice-president; Robert K. Morris, Lake Charles, secretary; Henry C. Melius, Metairie, treasurer; W. T. Oglesby, delegate, and R. B. Lank, alternate (both of Baton Rouge), to the AVMA Convention in Kansas City in August, 1959.

s/ROBERT K. MORRIS, *Secretary.*

Minnesota

Conferences on Bovine Mastitis at MIN. Offer a New Approach to Short Courses.—On

The officers of the Women's Auxiliary to the Eastern Iowa V.M.A. Left to right—Mrs. Russell Anthony, Cedar Rapids, treasurer; Mrs. Floyd Beaver, Grinnell, secretary; Mrs. K. H. Randolph, Lost Nation, vice-president; Mrs. J. M. Barclay, Brooklyn, past-president; Mrs. A. J. McIntosh, La Porte City, president; and Mrs. Leroy Bell, Davenport, president-elect.

Pictured (left) during the clinical laboratory section of the course is the group which participated in the second Conference on Bovine Mastitis held at the College of Veterinary Medicine at the University of Minnesota last fall.

two different occasions in 1958, the College of Veterinary Medicine at the University of Minnesota offered conferences on bovine mastitis with a lecture-laboratory format. The first course held last June could not accommodate all the applicants since the clinical laboratory necessarily limited participation, and a second course was sponsored in the fall.

The conferences on bovine mastitis are part of a series of specialty courses currently being offered by the College of Veterinary Medicine. Similar conferences have been carried to veterinary groups in outlying cities. Instructors in the courses are drawn from the staff members of the College of Veterinary Medicine, from the extension division, and occasionally from private practice.

The combined program of lecture-laboratory study is coordinated by Dr. Raymond Solac, assistant professor and extension veterinarian in the College of Veterinary Medicine, and by the College's committee on short courses. Many members of the college's staff feel that more efficiency is gained and more useful knowledge is accumulated by this type of lecture-laboratory sequence on a specific subject; a combination which, in their opinion, creates an ideal substitution for the usual annual short course.

s/ALVIN F. WEBER, *Correspondent.*

Missouri

Greater St. Louis Association.—The Coronado Hotel was the site of the Nov. 7, 1958, meeting of the Greater St. Louis V.M.A.

Dr. Max Sutter of Jensen-Salsbery Laboratories presented an interesting talk on "Tranquilizing Drugs in Small Animals". In his presentation, he showed the dart gun that is used in tranquilizing wild animals.

s/EDWIN E. EPSTEIN, *Secretary.*

Nebraska

Dr. L.V. Skidmore Retires—Dr. R.L. Sweat Joins University of Nebraska.—After 38 years of service, Dr. Louis V. Skidmore (KSC '20), Lincoln, retired from the University of Nebraska, last spring.

Dr. Robert L. Sweat recently joined the staff of the Department of Animal Pathology & Hygiene, College of Agriculture, to fill the position vacated by Dr. Skidmore's retirement. Dr. Sweat is a 1956 graduate of Colorado State University.

Before joining Nebraska's staff, Dr. Sweat was with the Department of Veterinary Virology at the Walter Reed Army Institute of Research in Washington, D.C. His research there was on the viral diseases of animals transmissible to man. Dr. Sweat will devote almost all of his time at Nebraska to research on infectious diseases of beef cattle.

s/GEORGE A. YOUNG, *Correspondent.*

New York

State Association.—During the business session of the annual meeting of the New York State V.M.S. at the Concord Hotel, Kiamesha Lake, on September 6, the following officers

Dr. Peter Olafson

were elected for the ensuing year: Drs. Peter Olafson, Ithaca, president; Hadley C. Stephenson, Ithaca, president-elect; and William J. Sellman, Utica, treasurer.

The officers appointed by the Executive Board were: Mr. Samuel C. Steiger, Utica, executive secretary; and Miss Joan S. Halat, Utica, assistant executive secretary.

s/JOAN S. HALAT, *Assistant Executive Secretary.*

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N. Y. Academy of Sciences Sponsors Conference, Jan. 6.—The Division of Mycology at the N. Y. Academy of Sciences will present a Conference on Genetics of Streptomyces and Other Antibiotic-Producing Microorganisms at the Barbizon-Plaza Hotel in New York on January 6. Waclaw Szybalski, Rutgers University, New Brunswick, N. J., is conference chairman.

In addition to a selection of speakers from ten different states the program will include representatives from five foreign countries: Rome, Italy; Tokyo, Japan; Moscow, U.S.S.R.; Cambridge, England; and Liège, Belgium.

Oregon

State Association.—The fall clinic meeting of the Oregon V.M.A. met at the Hotel Umpqua in Roseburg, Sept. 19-20, 1958.

Among the speakers on the program were: Drs. Graham I. Alexander, Brisbane, Australia; A. C. Baronti, Eugene; R. H. Bradbury, Vernon, Wash.; S. E. Davis, McMinnville; E. M. Hanawalt, Central Point; R. E. Koenig, Portland; O. H. Muth, Cornvallis; K. J. Peterson, Salem; L. R. Vawter, Cornvallis; and J. D. Wheat, Davis, Calif.

Clinics at the Douglas County Fairgrounds included: the procedure for examination of horses for soundness for prospective buyers or for insurance; the examination and demonstration for diagnosis of lameness; demonstration of procedure and uses of steroid injections for lameness and results to be expected; and a refresher course on nerve blocks in horses, cattle, and materials used.

The next regular meeting of the Oregon V.M.A. will be held in Portland, the last week of January, and the next fall clinic meeting is scheduled for Sept. 25-26, 1959, at Baker.

s/O. H. MUTH, *Resident-Secretary.*

Tennessee

Southern Association.—The forty-first annual convention of the Southern V.M.A. was held at the Hotel Claridge in Memphis, Oct. 26-29, 1958.

The four-day program embraced a deversified selection of topics including: the life span of transfused red blood cells, current progress in the control and prevention of rabies, chemical poisoning in large and small animals, veterinary medicine and atomic energy, screwworm eradication in the south, evaluation of breeding soundness of bulls, recent advances in the management of malignant tumors, and feline practice.

Dr. Thomas Bullington, Fayetteville, Tenn., moderated the panel on large animals and Dr. Peter S. Roy, Jacksonville, Fla., was moderator of the small animal panel. Participants were drawn from a large cross section of the Southern area.

Dr. R. E. Rebrassier, president of the AVMA, discussed "Newer Trends in Veterinary Medicine" on the second day of the meeting and on the third day a film entitled "Contrast Radiography and Cineflourography of the Genito-Urinary Tract" was shown.

Texas

Women's Auxiliary.—The Women's Auxiliary to the Texas V.M.A. met in conjunction with the state's association meeting at the Stephen F. Austin Hotel in Austin, Oct. 19-21, 1958.

Mrs. J. E. Habluetzel

A luncheon, buffet dinner, and book review of "Don't Eat the Daisies" were among the events on the program. At the business meeting, the auxiliary voted to contribute to the AVMA Research Fund, Award and Loan Fund, and to the library at the A. & M. College of Texas.

Elected to serve the organization for the ensuing year are: Mrs. J. E. Habluetzel, Ingleside, president; Mrs. W. F. Juliff, San Angelo, president-elect; Mrs. Leon G. Cloud, Fort Worth, vice-president; Mrs. S. S. Linam, Austin, secretary-treasurer; and Mrs. H. T. Barron, Taylor, corresponding secretary. Mrs. J. E. Habluetzel was selected as delegate and Mrs. U. E. Marney of San Antonio, as alternate, to the AVMA Convention in Kansas City in 1959.

FOREIGN NEWS

Germany

A Report of the Biennial Meeting of the German V.M.A. in Hannover.—Dr. Karl Ohly, president of the German V.M.A. since 1954, presided at the biennial meeting of the Association in Hannover, Sept. 19-21, 1958. Dr. Geddert, president of the Niedersachsen Veterinary Association (regional veterinary medical association), assisted Dr. Ohly. Uniquely distinguished in the veterinary profession, Dr. Ohly has received two awards from the president of the Federal Republic of Germany in recognition of his many services to his nation.

Professor Trautwein, University of Freiburg,

Dr. Karl Ohly (left) thanks Colonel Jennings upon the completion of his greetings from the AVMA.

presented an interesting and informative discussion on the theme of the convention, "The Veterinarian as Friend and Counselor to the Farmer." Foods from animal sources and their importance in the nutrition of the peoples of the world was presented by a former consultant on the Council for European Economic Affairs, Dr. K.H. Olsen.

Papers on animal parasites—their prevention and control, artificial insemination, metabolic disturbances in swine, and disease control programs in the various regions of Germany were also delivered. Veterinarians from many European countries attended the meeting.

Col. William E. Jennings, chief of the United States Army Veterinary Service in Europe, represented the AVMA and extended the Association's greetings and best wishes to the German V.M.A.

s/COL. WILLIAM E. JENNINGS, *Correspondent.*

Netherlands

Congress on Animal Reproduction Postponed.—The Organizing Committee in the Netherlands announced last October, that after consultation with the members of the Executive Committee, it has been decided that the Fourth International Congress on Animal Reproduction will not be held in 1960, as initially planned, but that it is postponed until June 5-10, 1961, at the Hague.

The main reason for this postponement is that the Congress of the International Husbandry Association to be held in Hamburg on June 12, 1961, will provide a logical follow-up to the Congress on Animal Reproduction. Anyone desiring further information, may write to the secretary of the Organizing Committee, Dr. L. Hoedemaker, Pr. Mauritslaan 99, The Hague.

s/L. HOEDEMAKER, *Secretary.*

Switzerland

Second Symposium of I.A.V.F.H. Postponed.—Preliminary plans for holding a meeting of the International Association of Veterinary Food-Hygienists in 1959, have now been dropped. Contrary to previous announcements, the Second Symposium of the I.A.V.F.H. is now scheduled to be held at Basel, Switzerland, May 15-21, 1960, according to the Secretariate of the Association.

The Organizing Committee of the XVIth International Veterinary Congress adjudged that the organization of such a Symposium of the I.A.V.F.H., in 1959, would seriously compete with the International Congress to be held May 21-27, 1959. Further announcements will follow regarding the Second Symposium of the I.A.V.F.H. but anyone desiring immediate communication, may write to the president of the I.A.V.F.H., Dr. A. Clarenburg, 1 Sterrenbos, Utrecht, The Netherlands.

s/A. CLARENBURG, *President.*

DEATHS

Star indicates member of AVMA

John Leo Carolan (ONT '10), 79, North Rose, N. Y., a practicing veterinarian in Wayne County for approximately 50 years, died Sept. 25, 1958, at Clifton Springs Sanitarium. He had been in failing health for a few years.

Born in Auburn, Dr. Carolan attended schools in Auburn and in Dobbs Ferry. Locating in Albion for several years, he moved to Rose about 44 years ago. For many years, Dr. Carolan had been a supervising veterinarian for the N. Y. State Department of Agriculture, a position which took him through ten counties of Western N. Y.

Dr. Carolan was a member of the Rose Masonic Lodge, Rose Fire Department, Lyons Rotary Club, and the Albion Lodge of Elks. A sister, a brother, nieces, and nephews survive.

Robert Holt Davis (NYA '05), 80, Quakertown, Pa., died in Vero Beach, Fla., Nov. 1, 1958, after a lingering illness.

A native of Newark, Del., Dr. Davis has been dividing his time, since his retirement 12 years ago, between Quakertown, where he had lived for 40 years, and Vero Beach. He was a life member of the Connecticut V.M.A., a member of the Union Lodge 5, A.F. & A.M., Stamford, a 32nd degree Mason, Knights Templar, and the Stamford Commandery 12.

Dr. Davis is survived by his widow, Lulu Heerdt Davis, and a son.

Edward S. Harrison (CVC '14), 70, Burlington Junction, Mo., died at home on Oct. 24, 1958. He had suffered with a heart condition since 1943.

Born in Corning, Iowa, Dr. Harrison moved to Missouri after graduation from the Chicago Veterinary College. He had engaged in practice in Burlington Junction for 37 years until poor health forced his semi-retirement.

Dr. Harrison was a member of the Burlington Junction Christian Church, the Burlington Junction Masonic Lodge, and the Missouri V.M.A. He is survived by his widow, the former Hulda Bell, a son, a daughter, and three grandchildren.

A Masonic service was held at the cemetery and Dr. Harrison's colleagues from the area acted as pallbearers.

★**John Jaffray** (CVC '03), 77, Oak Park, Ill., well-known veterinarian who had practiced continuously in Chicago for over a half-century, died on Nov. 24, 1958, following a coronary attack.

Born in Chicago July 14, 1881, Dr. Jaffrey received his early education in the local grammar and high schools and then took special courses at the Armour Institute of Technology before enrolling at Chicago Veterinary College where he was awarded the M.D.C. degree (doctor of comparative medicine) in 1903.

Immediately upon graduation, he entered private practice with his older brother, the late Dr. David S. Jaffray (CVC '99), in an animal hospital and horse-showing establishment which had been operated by their father when horses comprised the major portion of veterinary work in cities.

In later years, the Jaffray brothers established a thriving small animal practice and hospital on West Madison Street in which Dr. John was active until his death. He was also an active and key figure in local veterinary circles and did much to promote interest in, and the work of, the Chicago V.M.A. in the days when veterinary practice was undergoing transition from mostly equine patients to small animals; he served as president of the Association in 1916-1917 and as secretary from 1917 to 1930.

In recognition of the many contributions Dr. & Mrs. Jaffray made to the veterinary profession in Chicago, they were honored at a dinner attended by many friends and colleagues, in March, 1953, upon the occasion of Dr. Jaffray's 50th anniversary of his entry into practice.

Dr. Jaffray was also honored by selection as "Illinois Veterinarian of the Year" at the Diamond Jubilee meeting of the Illinois V.M.A., in Chicago, in February, 1957. On that occasion, he was featured on a radio news interview during which he expressed his viewpoint on his profession as follows: "the largest field of animal medicine is in livestock; the most sentimental is in the treatment of pets. But our profession's main objective is to help keep our nation strong and prosperous through maintaining the health of farm animals and the control of all diseases transmitted by animals."

Surviving are his widow, the former Mary Conroy, whom he married in 1905; one son, Dr. David S. Jaffray, physician and surgeon of Chicago; a daughter, four grandchildren, and one brother.

★**William E. McGarth** (MON '88), 96, Howick, Que., died Oct. 7, 1958, after a short illness. He had been a life-member of the AVMA since 1954.

Born in North Georgetown, Dr. McGarth attended Huntington Academy and later entered McGill University in Montreal. He later obtained his M.D. degree in 1898, from the Harvey Medical College in Chicago.

Dr. McGarth was employed at the Union Stock Yards in Chicago for 54 years. He received a Certificate of Meritorious Service from Governor Dwight H. Green of Illinois commemorating his long and fruitful years of service.

Surviving Dr. McGarth are two sisters.

Franklin Jasper Neiman (ONT '98), Marshalltown, Iowa, died Oct. 23, 1958, at his home after an extended illness.

He had served as assistant state veterinarian. Dr. Neiman was a member of the Iowa V.M.A. and the Eastern Iowa Veterinary Association, Inc.

★**James E. Sherwood** (COR '23), 60, Granville, N.Y., died in Glens Falls Hospital on Oct. 17, 1958.

Born in Suffern, N.Y., Dr. Sherwood practiced there for many years until his semi-retirement about eight years ago. He was a member of the New York State V.M.S. and Alpha Psi.

Dr. Sherwood is survived by his widow, Anna L. Scott Sherwood, and two brothers.

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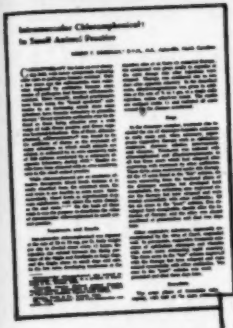

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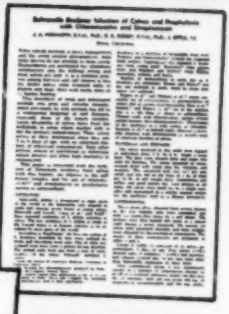

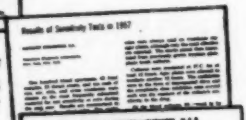

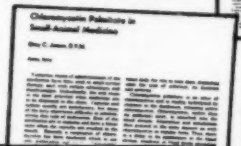

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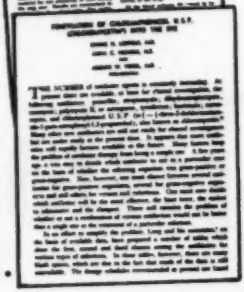

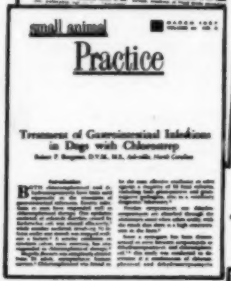

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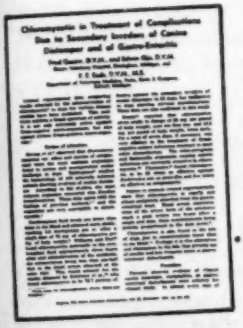

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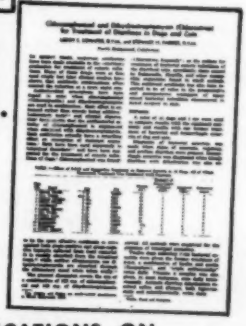

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COMING MEETINGS

Notices of coming meetings must be received 30 days before date of publication.

New York Academy of Sciences. Conference on genetics of streptomyces and other antibiotic-producing microorganisms. Barbizon-Plaza Hotel, 101 West 58th St., at 6th Ave., N.Y., Jan. 6, 1959. Waclaw Szybalski, Rutgers University, New Brunswick, N.J., chairman.

Cornell University. Fifty-first annual conference for veterinarians. New York State Veterinary College, Ithaca, Jan. 7-9, 1959. W. A. Hagan, dean.

Southern California Veterinary Medical Association. Annual meeting. Beverly Hilton Hotel, Beverly Hills, Jan. 10, 1959. R. J. Schroeder, 1919 Wilshire Blvd., Los Angeles, Calif., program chairman.

Tennessee Veterinary Medical Association. Annual meeting. Noel Hotel, Nashville, Jan. 11-13, 1959. H. W. Hayes, 5009 Clinton Pike, Knoxville, secretary-treasurer.

Kansas Veterinary Medical Association. Fifty-fifth annual convention. Hotel Broadview, Wichita, Kan., Jan. 13-15, 1959. Dr. Maynard Curts, 5236 Delmar Ave., Kansas City 3, Kan., secretary.

Indiana Veterinary Medical Association. Annual meeting. Hotel Severin. Indianapolis, Ind., Jan. 14-16, 1959. George R. Burch, program chairman.

New York Academy of Sciences. Conference on biology of the pleuropneumonia-like organisms. New York Academy of Sciences, 2 East Sixty-Third St., New York City, Jan. 14-16, 1959. Robert L. Burkhard, chairman.

American Animal Hospital Association. Fifth annual region two meeting. Atlanta Biltmore Hotel, Atlanta, Ga., Jan. 18-19, 1959. Dr. R. P. Knowles, 2101 N.W., 25th Ave., Miami 42, Fla.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Iowa, Jan. 20-22, 1959. F. B. Young, executive secretary.

Michigan State University. Thirty-sixth annual postgraduate conference for veterinarians. College of Veterinary Medicine, Michigan State University, East Lansing, Mich., Jan. 21-22, 1959. W. W. Armistead, dean.

Oklahoma Veterinary Medical Association. Annual meeting. Hotel Mayo, Tulsa, Jan. 25-27, 1959. Larma Bennett, 2805 S.W. 51st St., Oklahoma City, Okla., executive secretary.

Intermountain Veterinary Medical Association. Annual convention. Hotel Utah, Salt Lake City, Jan. 22-24, 1959. Douglas R. McKelvie, correspondent.

Oklahoma Veterinary Medical Association. Annual meeting. Mayo Hotel, Tulsa, Jan. 25-27, 1959. M. N. Riemenschneider, 122 State Capitol Bldg., Oklahoma City, secretary.

Minnesota State Veterinary Medical Society. Annual meeting. Leamington Hotel, Minneapolis, Jan. 26-28, 1959. B.S. Pomeroy, University of Minnesota, College of Veterinary Medicine, St. Paul 1, Minn. secretary-treasurer.

Louisiana State University. Annual conference. Pleasant Hill, Louisiana State University Campus, Jan. 27-28, 1959. William T. Oglesby, correspondent.

Maryland State Veterinary Medical Association. Winter meeting. Emerson Hotel, Baltimore, Md., Jan. 27-28, 1959. Harry L. Schultz, Jr., secretary-treasurer.

California Veterinary Medical Association. Midwinter conference. School of Veterinary Medicine, University of California, Davis, Feb. 2-4, 1959. John W. Kendrick, conference chairman.

Ohio State Veterinary Medical Association. Annual convention. Neil House Hotel, Columbus, Feb. 4-6, 1959. Ohio V.M.A. offices, 1411 W. Third Ave., Columbus, Ohio.

Oregon Veterinary Medical Association. Winter meeting. Multnomah Hotel, Portland, Feb. 6-7, 1959. O. H. Muth, secretary-treasurer.

Illinois State Veterinary Medical Association. Annual meeting. LaSalle Hotel, Chicago, Feb. 16-18, 1959. C. B. Hostetler, 1385 Whitcomb Ave., Des Plaines, executive secretary.

Indiana Veterinary Medical Association and Vita Vet Laboratories. Annual nutrition conference for veterinarians. Public Health Building, Indianapolis, Ind., Feb. 25, 1959. J. M. Carter, chairman.

Third Pan American Congress of Veterinary Medicine and Ninety-Sixth Annual Meeting, American Veterinary Medical Association. Joint meeting. Kansas City, Mo., Aug. 23-27, 1959. H. E. Kingman, Jr., executive-secretary, AVMA, 600 S. Michigan Ave., Chicago 5, Ill. B. D. Blood, secretary-general, Directing Council, Pan American Congress of Veterinary Medicine, P.O. Box 99, Azul, F.C.N.G.R., Argentina, S.A.

Foreign Meetings

International Veterinary Congress. Sixteenth session. Madrid, Spain, May 21-27, 1959. Prof. Pedro Carda A., general secretary, Calle Villanueva 11, Madrid.

U.S. COMMITTEE: Dr. W. A. Hagan, chairman, New York State Veterinary College, Ithaca, N. Y.; Dr. J. G. Hardenbergh, secretary, 600 S. Michigan Ave., Chicago 5, Ill.

Third World Congress on Fertility and Sterility Amsterdam, Holland, June 7-13, 1959. Dr. L. I. Swaab, Sint Agnietenstraat 4, Amsterdam, Holland, honorary secretary.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. Dr. G. W. Jones, Main St., Prattville, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. S. A. Price, 213 N. 15th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. W. David Gross, 771 Holcombe Ave., Mobile, Ala., secretary.

North Alabama Veterinary Medical Association, the second Thursday of November, January, March, May, July, and September, in Decatur, Ala. Ray A. Ashwander, Decatur, Ala., secretary.

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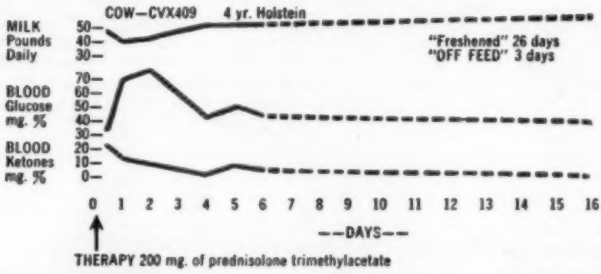

This chart shows the good response in ketotic cow following intramuscular injection of 200 mg. of Ultracortenol.

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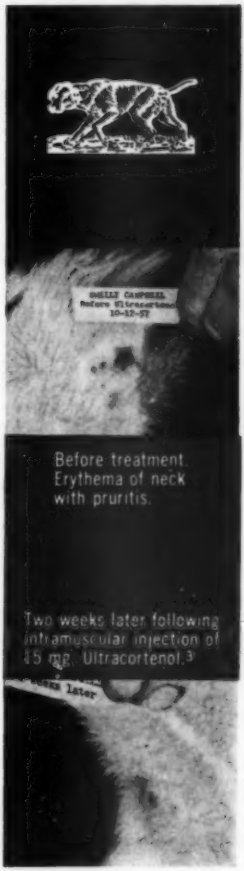
Before treatment. Erythema of neck with pruritis.
Two weeks later following intramuscular injection of 15 mg. Ultracortenol.[3]

References: 1. Vigue, R. F.: J.A.V.M.A. *133*:326 (Sept. 15) 1958. 2. Shaw, J. C.: Personal communication. 3. Pollock, S.: To be published. 4. Rabin, P. H.: Personal communication. 5. Hoffer, S. H.: Personal communication. 6. Weir, H. T., and Hazelrig, J. W.: Personal communication. 7. Beck, J. W.: Personal communication. 8. Bull, W. S.: Personal communication. 9. Fessenden, P. E.: Personal communication. 10. Lohmeyer, C.: Personal communication.

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Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2 Box 697, Tucson, Ariz., secretary.

ARKANSAS—Pulaski County Veterinary Medical Society, the second Tuesday of each month. Harvie R. Ellis, 54 Belmont Drive, Little Rock, Ark., secretary-treasurer.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. Leo Goldston, 3793 Broadway, Oakland 11, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16 St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. James L. Frederickson, 17 Niles St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643-N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. R. M. Granfield, 2600 W. El Camino Real, San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert L. Chandler, P.O. Box 8, Ukiah, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

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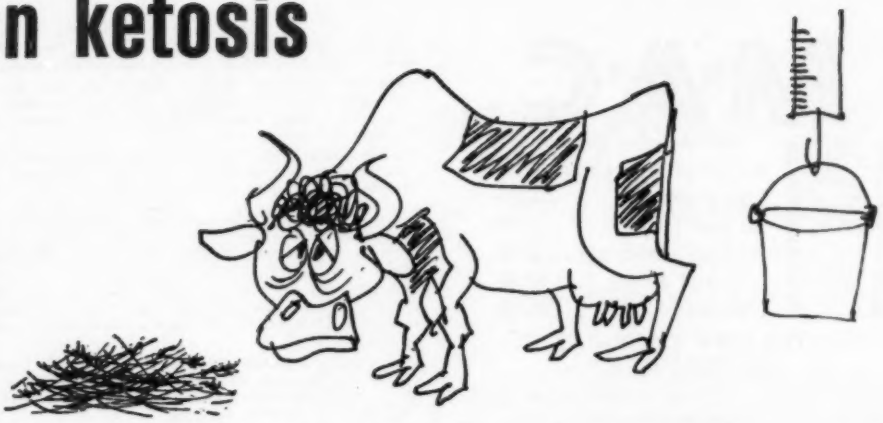

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Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month, except June, July, and August, at 6:30 p.m., Breeze House, Ankeny, Iowa. John Herrick, Ames, secretary.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Association, the second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. Dr. J. G. Irwin, Iowa City, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, Milford, secretary.

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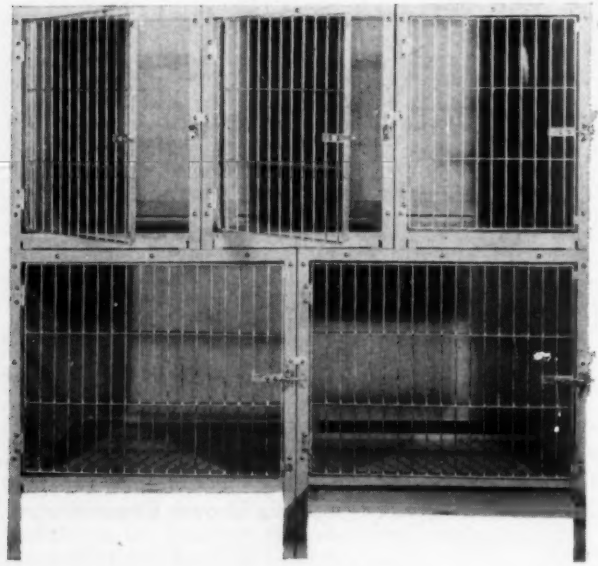

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Southeastern Iowa Veterinary Association, the first Tuesday of each month at Mt. Pleasant, Iowa. Warren Kilpatrick, Mediapolis, secretary.

Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, Creston, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at 7:00 p.m., at All Vets Center, Clear Lake, Iowa. Richard Baum, Osage, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. R. H. Folsom, P.O. Box 323, Danville, Ky., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday of each month in Louisville or within a radius of 50 miles, except January, May, and July. G. R. Comfort, 2102 Reynolds Lane, Louisville, Ky., secretary-treasurer.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Norman Herbert, 3506 Joann Drive, Baltimore 7, Md., secretary.

MICHIGAN—Central Michigan Veterinary Medical Association, the first Wednesday of every month at 7 p.m. Frank A. Carter, P.O. Box 78, Carson City, Mich., secretary.

Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Frank A. O'Donnell, Parksville, Mo., secretary-treasurer.

NEVADA—Western Nevada Veterinary Society, the first Tuesday of each month. Paul S. Silva, 1170 Airport Road, Reno, Nev., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April, except December, at the Irvington House, 925 Springfield Ave., Irvington, N.J. Bernard M. Weiner, 787 Clinton Ave., Newark, N.J., secretary.

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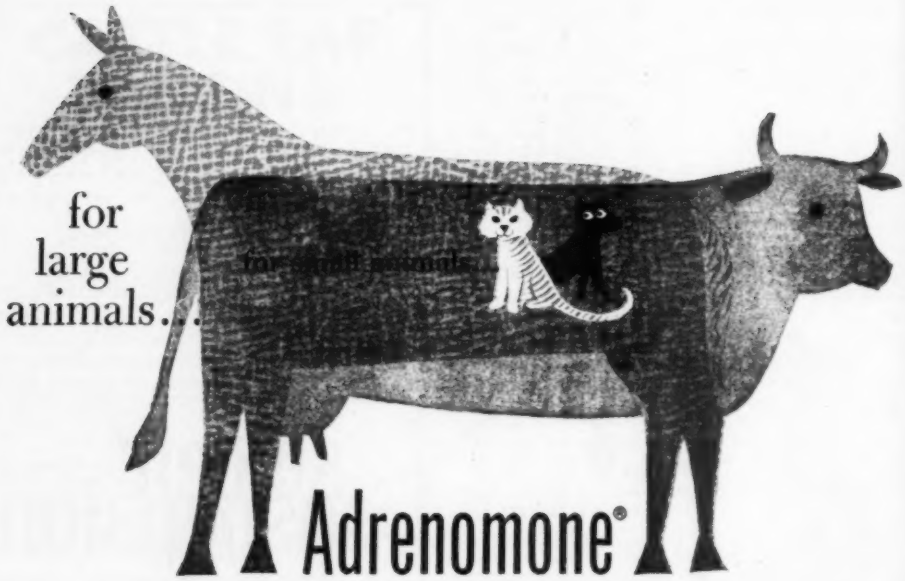

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Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. L. Smith, P.O. Box 938, Trenton, N.J., secretary.

Southern New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collingswood Veterinary Hospital, Collingswood. R. M. Sauer, secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, third Wednesday of each month, Fez Club, Albuquerque, N.M. Jack Ambrose, 3018 N. Rio Grande Blvd., Albuquerque, secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. W. R. Dobbs, Box 869, Albemarle, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly, Byron H. Brow, Box 453, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month. T. L. James, Box 243, Newton, N. Car., secretary.

Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the second Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Asheville, N. Car. Vilu Lind, 346 State St., Marion, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road, G. C. Lewis, Cincinnati, Ohio, secretary-treasurer.

Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, Dayton, secretary.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. D. J. Kern, Killbuck, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the fourth Tuesday of each month, at 9:00 p.m., Youngstown Maennerchor Club, Youngstown, Ohio. Sam Segall, 2935 Glenwood Ave., Youngstown, secretary.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

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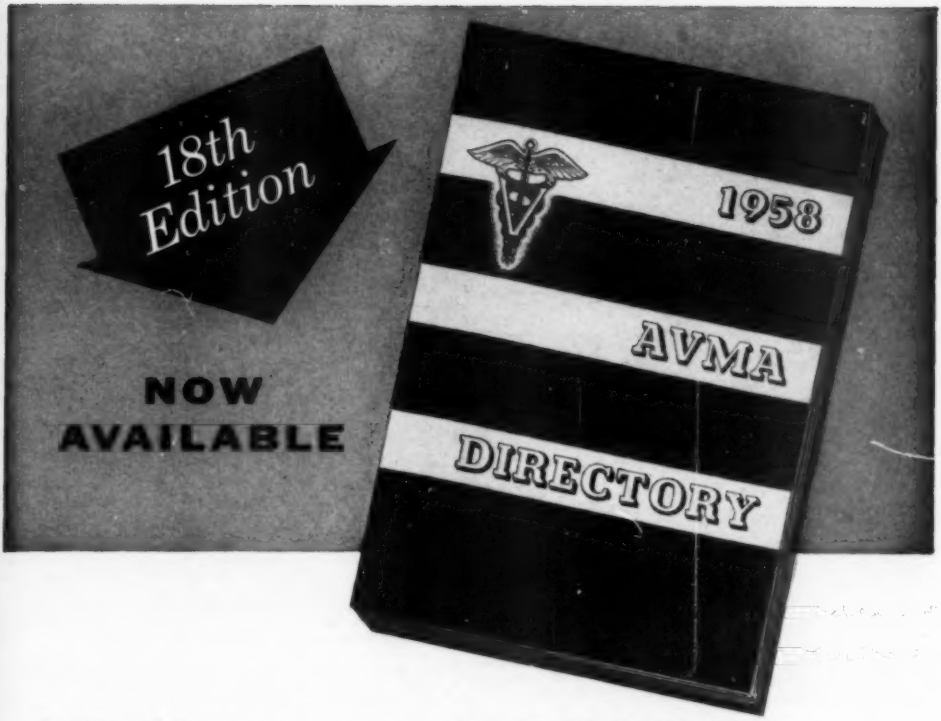

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Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Forest H. Stockton, 2716 S.W. 29th St. Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Arlen D. Hill, 5302 E. 11th St., Tulsa, Okla., secretary.

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Tulsa Association of Small Animal Veterinarians, first and third Mondays, City-County Health Dept. T. E. Messler, 3104 E. 51st St., Tulsa, Okla., secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m. Ireland's Restaurant, Lloyds', 718 N.E. 12th Ave. Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Williamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Marvin M. Corff, McMinnville, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

Georgia-Carolina Veterinary Medical Association—see GEORGIA.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary Ct., Richmond 20, Va., secretary.

Northern Virginia Veterinary Conference, the second Tuesday of each month. Francis E. Mullen, 1130 S. Main St., Harrisonburg, Va., secretary-treasurer.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. D. F. Watson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 10415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.). D. F. Ludvigson, Ridgeland, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. R. H. Steinkraus, 7701 N. 59th St., Milwaukee, Wis., secretary.

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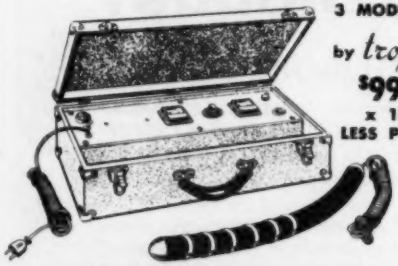

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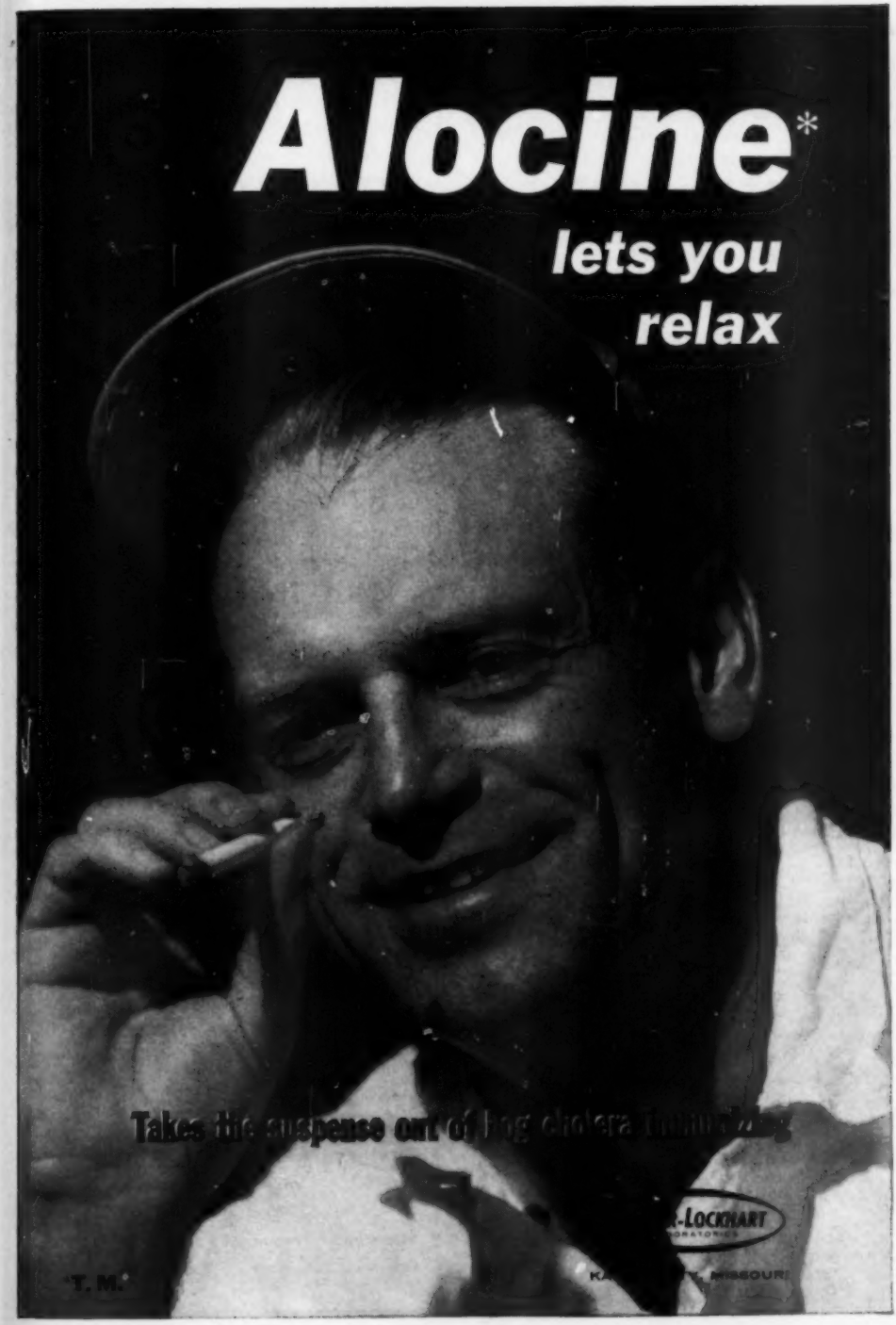
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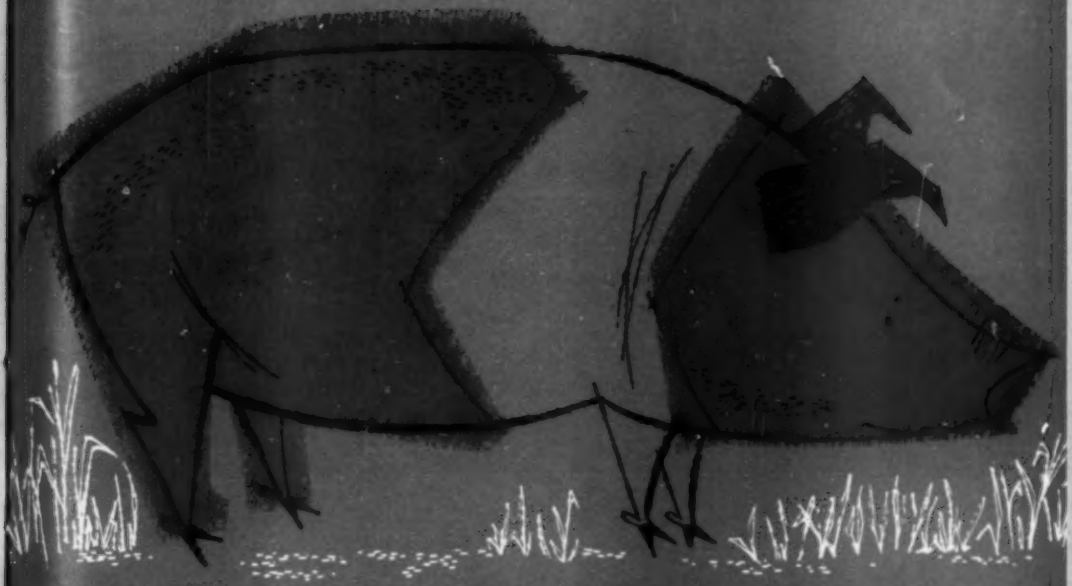

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